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Revised Passenger Fares

THE British Transport Commission, in preparing its original Passenger Charges Scheme, may have been of the opinion that the logic of its policy in levelling up sub-standard and standard fares would be appreciated. Instead its results provoked widespread disapproval, to the extent that the Government intervened to suspend the operation of the scheme outside the London area. This led to further expressions of dissatisfaction from Londoners, who continued paying the higher rates during discussions of a revised scheme between the B.T.C. and the Minister of Transport. Last Monday the Minister announced in the House of Commons the changes to be made in the present scheme, which are intended to come into effect in London on August 31 and elsewhere on September 1. His statement, reported on another page, implements the decision approved by the House of Commons on April 28 that disproportionate increases should not be applied to certain passenger charges outside the London area, while means should be sought of applying the same principle as far as practicable to rail and bus fares in the London area. Consequently ordinary and early morning fares and season ticket rates on London Transport, and workmen's and early morning fares and season ticket rates (other than those for traders' season tickets) on British Railways, will be increased only by the

same amount as a standard charge of the same value. Other adjustments will apply to certain sub-standard ordinary fares on British Railways, which are to be raised by 20 per cent. instead of by as much as 42 per cent. as provided for under the Passenger Charges Scheme; and to concession fares for certain classes of travellers. The discount on bulk travel fares will cease. The Minister estimated a total loss of revenue to the British Transport Commission in a full year of £1,900,000 as a result of these changes, or about 60 per cent. of the total surplus earned by the British Transport Commission in 1951. Prospects for the current year point to pressure of rising costs in addition to this loss of revenue, and the possibility is seen already of the B.T.C. having to apply for further fares increases by the end of this year.

Joint Consultation

THE structure of joint consultation in the nationalised industries is described in detail in a booklet, "The Framework of Joint Consultation," published by the Acton Society Trust. Of the railways, the booklet observes that, unlike the other nationalised industries, they have no regional management with overriding authority within the area. Consequently, with each local department or group of grades represented at local level by a Local Departmental Committee, and at Regional level by a Sectional Council, and with the vertical linking of Local Departmental Committees, Sectional Councils, and the Railway Staff National Council, there is no horizontal link. No means are provided whereby the several Local Departmental Committees which may be found in one establishment may meet to discuss matters of common interest. At District level, it is pointed out, no machinery exists at all. The authors comment that, in British Railways consultative committees, more time is given to negotiating than to consultative matters. "Perhaps the most significant comment," they add, "which can be made on the machinery . . . in the railways is that the most effective consultation appears to take place outside the formal committees." In support of this, they cite the "efficiency committee" set up after the wages agreement early in 1951. Such additional bodies, they state, are defended on the ground that "they get things done"; although they may be a valuable supplement, there is a danger that their development may weaken the existing statutory machinery.

Revising the C.N.R. Capital Structure

THE Canadian Cabinet has had under consideration a plan for the financial reorganisation of the Canadian National Railways, based mainly on the recommendations of the Royal Commission on Transportation. The top-heavy capital structure of the system is largely an inheritance from the companies which went to form it. It is expected that the demands on the C.N.R. revenues made by its debt to the Government of some \$750,000,000 will be eased, and the railway thereby enabled to earn a small profit in a normal year. The Canadian National, except for the years 1926, 1928, and 1941-45, has been unable to meet its heavy fixed interest charges. The Royal Commission reported: "The Canadian National Railways has established a case for reduction of its fixed charges and for the desirability of the company being able to accumulate out of earnings a reserve or 'something to come and go on'." It may not, however, be allowed under the scheme to retain its surpluses, as the Royal Commission had suggested, and they would be used at the discretion of the Government. The proposed new arrangements will take into account the fact that the system has, since the last Budget, to pay federal income tax in the same way as privately-owned railways.

Saving Through Standards

A RECENT report by the Productivity & Technical Co-operation Division of the American Mutual Security Agency, "Dollar Savings Through Standards," covering 81 industries and industrial products, shows a sharp rise in the standards movement in the U.S.A. since the war, especially in the past two years. The observations of several railway managements are quoted on the benefits

resulting from purchasing under standards. An important Eastern railroad sums these up as: in procurement, purchase of economical quantities, a reduced volume of accounts and so on, elimination of disputes, and broader competition among suppliers; in engineering, enhanced interchangeability and co-ordination of new with existing designs; improved distribution; and reduced inventories and storage costs with simplification of office work. A large manufacturer of air brake equipment points out the benefits to his industry of application of standards principles to purchased parts and miscellaneous raw materials. The report also adduces evidence of the savings through simplified book-keeping and reduced storage space, as reported by the Association of American Railroads.

Wagons-Lits Company Services

THE summer edition of the *Guide* to the sleeping, Pullman, restaurant, and buffet car services of the Compagnie Internationale des Wagons-Lits et des Grands Express Européens shows not only seasonal developments in services to holiday resorts in Western Europe and the Alps, but also considerable expansion of the company's activities in Western Germany, in Turkey, in the French possessions in West and Central Africa, and in the Belgian Congo. The services affecting Germany are in transit, or terminate outside Germany, wholly internal services being provided by the German Sleeping & Dining Car Company, successor to the Mitropa Company. The main factor affecting Wagons-Lits postwar activities in Europe is the Iron Curtain, east of which few services are now worked by the company; there are still, however, restricted through sleeping car services between Western European centres and Prague, Warsaw, Budapest, and Bucharest. In Yugoslavia, the State Railways continue to work internal sleeping and restaurant services, the "Simplon-Orient Express" in transit being the only Wagons-Lits Company commitment. Besides its new ramifications in Turkey-in-Asia, an important development is provision of buffet facilities in the electric and diesel interval services of the Netherlands Railways.

Planning Transport for Africa

TODAY more than ever the world looks with hope towards the areas where great natural resources await development. Sometimes their existing transport systems were planned with sectional interests in mind, but the time has come when further expansion must follow a course conceived on broader lines. This theme, with Africa as its background, is discussed by Mr. W. Marshall Clark, formerly General Manager, South African Railways & Harbours, in the June issue of *Optima*, a quarterly review published by the Anglo American Corporation of South Africa Limited. As an example of how concern for the revenues of one administration may lead to schemes not in the best general interest, or even in the long run of doubtful benefit to themselves, Mr. Marshall Clark quotes the Southern Rhodesian plan for building a new railway to Lourenco Marques. He suggests that a link of about a quarter this length between West Nicholson and Beit Bridge would achieve the same purpose and at the same time provide an additional route to the Transvaal, augmenting the existing Bulawayo—Mafeking line. Customs barriers and special rates designed to protect the traffic of individual systems, says Mr. Marshall Clark, prevent full use being made of existing interconnections between railways, and he quotes fiscal difficulties restricting utilisation of the Benguela Railway to assist in the development of Northern Rhodesia.

Atomic Energy in Transport

THE possible uses of atomic energy in transport were foreshadowed recently by Mr. N. R. Crump, Vice-President of the Canadian Pacific Railway. He considered that it was quite possible that in our time atomic engines might prove practicable and economical for commercial transport. The glamorous days of spanning a continent and laying rails through the Rocky Mountains might be gone,

he said, but the search for quicker, safer, and more comfortable and more economical means of transport continued. He visualised major developments in all the four principal aspects of transport—power, vehicle, track and communications. It was safe to say that nowhere else in the world had the engineer played so large a part in the development of a nation as in Canada. Canada might expect still further developments of internal combustion engines of various types, seeking to reduce weight and size, increase output, lower fuel consumption and use less expensive fuels. Transport undertakings, also, planned to enhance safety and increase efficiency by using technological advances made in the communications industry, among them radar, micro-wave communication, and aircraft flight control.

Concrete-filled Bags as Protective Pitching

IN the past, bags filled with concrete have occasionally been used as a substitute for stone pitching, but never with so many refinements as in the protection of the new embankment on the Erie Railroad diversion at Corning, N.Y., constructed to eliminate a series of level crossings. As realigned, the railway runs parallel and exposed to the flow of two rivers and crosses two others; at one point the river flows directly towards it and is deflected by the bank. For its protection no rock was available within economic distance, and it was therefore decided to use bagged concrete. Where the toe of the slope is exposed to the direct flow of the water, 16-ft. sheet piling was driven 8 ft. into firm ground and protected from the current by an apron of rock. In other places the toe of the pitching is anchored by a rock-filled trench. At a central plant the concrete was mixed in the proportions 1:2½:5 and carted in specially-adapted lorries to the bank top. There the bags were filled, "sewn up" with staples, and slid down chutes to be closely packed by hand on the meticulously-sloped bank; they were then secured in position with ¾-in. round dowels 6 ft. long, driven through them, and flattened to a minimum thickness of 9 in. with a pneumatic back-fill tamper. The whole pitched area, covering 56,000 sq. yd. or nearly 12 acres, was then cured by continuous sprinkling with hoses for seven days.

A Charge under an Old Act

AN engine driver in Scotland has been charged under the Regulation of Railways Act, 1842, with being drunk on his engine. This Act, and also one of 1840, empowered any officer or agent of any railway company, or any duly appointed special constable and anyone they might call on to assist, to detain any engine driver, guard, porter or other servant of that company found drunk while employed on the railway, or committing any offence against its bye-laws, rules or regulations, or wilfully, maliciously or negligently doing, or omitting to do, any act, whereby the life and limb of any person on the railway or its works might be endangered or injured. The Offences against the Person Act of 1861 also bore on this matter, for it laid down that anyone whose wilful omission or negligence endangered the safety of any person being on, or being conveyed on, a railway should be guilty of a misdemeanour. In the recent case, the defence raised the legal objection that it was a domestic matter for the railway company, but it was later ruled at the Lanark Sheriff Court to be a matter of public interest, and the driver has been committed for trial on July 15.

Locomotives for the Jordan Railways

THE 105 cm. (3 ft. 5½ in.) gauge Hedjaz Railway was built mainly to facilitate Moslem pilgrim traffic to Mecca and Medina. After the first world war the system passed into the hands of three administrations. The Transjordan section was worked by the Palestine Railways until May 15, 1948. On May 16, 1948, the 227 miles of line extending between Deraa and Maan to the Najeb was taken over by the Jordan State and is now known as the Jordan Royal Hashemite Railways. Three locomotives, designed for oil burning, details of which are given elsewhere in this issue,

have recently been completed by Robert Stephenson & Hawthorns Limited for this railway. The engines are of the 2-8-2 type, with outside cylinders and Walschaerts valve gear. A Belpaire firebox is fitted. The boiler is lagged with 1 in. thick asbestos mattresses covering the barrel and firebox backplate.

British Timken axleboxes are fitted to the tender, engine trailing truck, and engine leading truck; the latter are of the cannon type. Ajax grease lubrication is provided for the coupled axleboxes, connecting and coupling rods. Skefko roller bearings are fitted to the eccentric cranks.

The Transport Bill and Scheme

THERE is good ground for belief that the Government has now drafted the terms of its new Transport Bill, which was outlined in the recent White Paper. Indeed, that should not have presented any great difficulty or delay, for it is evident that the Bill is to be couched in very broad terms. The reorganisation of the transport system is to be effected by a separate scheme which apparently is not nearly so clear cut. The principles incorporated in the Bill are to be the decentralisation of the railways and the offer for sale to private enterprise of "operable units" of the Road Haulage Executive's business.

Clearly it is on the terms of the scheme, rather than on those of the Bill, that the success of the projected reorganisation of the British transport system must depend. Everything will turn on the manner in which the principles outlined in the White Paper are implemented. If the view is accepted that one of the greatest needs of the time is to infuse into transport a healthy spirit of competition, while avoiding a return to the chaotic conditions between rail and road which marked the pre-war period, there is scope within the framework of the Government's policy to achieve it. The present organisation of six Executives, as we have frequently commented, was no real move towards integration of transport, which was the avowed object of the 1947 Act. The tendency was rather to establish a new set of vested interests and frequently to increase the amount of work and staff without any compensating improvement in efficiency.

On the assumption that operable units of road haulage are offered for sale to the public, it would appear reasonable—and no more than just—that British Railways should receive back the road interests of which they have been divested. If this were done, and if they were also permitted to tender for any of the operable units for which the public showed no inclination to bid, they would be placed in a good competitive position in relation to the new road hauliers. There would also be a greater incentive in the railway Regions to think in terms of British transport rather than of railways alone.

The Road Haulage Executive under this plan would cease to exist and there is no good reason why the Road Passenger Executive should not similarly follow it—or, better, precede it—into oblivion. The description of the Hotels Executive is a misnomer, for its major contribution on the hotels side of its business appears to have been conducted on the basis of closure or disposal. So far as its refreshment room, restaurant car and buffet car interests are concerned, they are an integral part of the railway service and could be more efficiently and economically conducted as a department of the railways. To a great extent similar considerations apply in the case of the docks.

The decentralisation of the railways might best be achieved by giving the Regions greater autonomy in management. A system under which each Region had its own General Manager assisted by a deputy and two or three Chief Officers of technical departments would allow for a measure of initiative and development which certainly would go far to revivify the spirit of enterprise in the railway service.

Matters such as wages, charges and similar general policy, which require central treatment, could be dealt with by a Chief General Manager, who in turn would be responsible to a body framed on broad lines which would have no executive or functional powers or duties. It would be in

effect a board of directors. The chairmanship should be a full-time appointment, but, in the case of the other members a wider basis would be secured by recruiting prominent industrialists, whose intimate knowledge of industry could not fail to be of value to the national transport system. In view of the State's interest, it might be expedient for a number of these directors to be appointed as Government nominees, especially charged to watch the interests of the State.

A scheme based on lines similar to the above would be calculated to bring about a new spirit in transport, would implement the Government policy of decentralisation and greater enterprise, and might provide less temptation to upset by a successive régime than more drastic measures.

Fourth Year of State Transport

THE British Transport Commission revenue surplus of £2.9 million for the year 1951, shown in the accounts, of which some details are given elsewhere in this issue, is the first achieved since the Commission was established. A surplus was not unexpected by those who studied the trend of receipts in relation to costs over the latter half of last year, and indeed was forecast in our issue of May 16. Nevertheless the accounts must surprise many critics of nationalised transport and more particularly of the railways, in Parliament and elsewhere, who have persisted in believing that the railways and the other undertakings of the Commission have been run at a loss. Incidentally, it was the Government which decided that the accounts should be issued separately from the report with which they have been published in preceding years; the report is to appear in some three weeks' time. This divorce of complementary documents, necessitating additional explanatory statements to accompany the accounts, does not seem to have accelerated publication of either; without insistence on the accounts being published separately, both they and the report might have appeared together earlier.

The encouraging feature of the results is that the surplus was achieved in a year not particularly favourable for nationalised transport. The present year, for reasons such as recent Government action over passenger fares, constantly rising costs, the recession in the textile industry, and a falling off in merchandise traffic, is likely to be less favourable. Nevertheless 1951 saw increases both in railway charges and in railway costs. British Railways net receipts of £31.7 million exceeded those for 1950 by over £8 million; working expenses were 8 per cent. above those for the previous year, largely because of two major wage increases. Total net traffic receipts were £40 million, £9.7 million over those for 1950; of carrying activities, only cartage, London buses and canals failed to show a surplus. In integration of transport, the progress in rationalisation of freight traffic by combining railway and road haulage resources was much impeded by trades union opposition. With passenger traffic, the Commission points out that after purchase during 1951 of controlling interests in bus undertakings, it could influence the allocation of passenger-carrying functions between road and rail.

The achievement of British Railways in offsetting increased cost by economics and improved locomotive and wagon user is shown on page 694, the economics effected are the more remarkable in view of the relatively small benefit—perhaps £800,000—derived from branch line closing, and of many uneconomic rates. The decline in the average passenger fare paid, 1.38d. in 1948 to 1.24d. in 1951, is caused largely by the increase in the proportion of journeys on cheap day and similar tickets. The fact of this decrease, and the general falling off in higher-priced travel, are a good argument against any suggestion that British Railways increased net receipts for 1951 justify a general lowering of fares. A greater allocation is required for maintenance, of which the railways have been starved since the war. The net receipts moreover are small in relation to turnover, so that the balance of receipts and expenditure is easily upset.

The working surplus of £3.2 million on road haulage is attributed by the Commission to the successful completion

by British Road Services of the first stage of their development; it was, however, achieved partly as a result of increases in charges in the earlier part of 1951. The net receipts of £3.9 million from the Commission's provincial and Scottish road passenger undertakings could not have been achieved without fare increases to offset rising costs, including that of oil fuel; it is interesting, incidentally, to note the Commission's observation that the price of oil fuel including duty had risen less, against prewar, than that of coal. It seems that conditions in the nationalised bus undertakings typify those in the provincial bus industry generally. The rise in outgoings was predicted in the B.T.C. report for 1950. What is remarkable—notwithstanding the local and piecemeal lodging by undertakings of applications to increase bus fares in the provinces, where public opinion is less mobilised and less subject of Parliamentary solicitude than in London—is public acquiescence in the increases compared with the furore over London Transport fares. The deficit on London Transport buses, as against the working surplus on the Underground—the first time in the history of London Transport that rail showed better results than road—is mainly the result of the inability of the London bus undertaking to raise its charges to meet the increased costs which could be covered in the provincial undertakings.

The net receipts of nearly £3 million on the Commission's shipping services are large in relation to gross receipts of £12½ million, and seem to be derived largely from the extensive cross-Channel services with their high fares. The Anglo-Irish services are less remunerative, and services in Scotland generally have ceased to pay largely because of changed travel habits ceasing to afford patronage to offset increased costs. The Hotels Executive results, as usual, are uneven. Refreshments rooms continued to pay their way rather more than in 1950. Hotels, where results are less consistent, showed a small working surplus. Restaurant car services continued to operate at a loss, which has resulted in the recent rise in meal prices; the only solution, apart from the replacement of restaurant cars proper by buffet cars, which is a debatable policy, is to regard restaurant car services as an essential amenity for the travelling public, and to return management of them to the railways which operate the services of which they are a part.

Despite these achievements, the Commission's surplus is small compared with a turnover of some £600 million. It seems unlikely to contribute towards capital expenditure. The Commission's cash, bills, and Government securities were reduced during 1951, but were some £92 million at the end of the year. The £60 million 1½ per cent. stock, moreover, issued to the National Debt Commissioners is redeemable at the end of this year. Commitments for authorised capital expenditure were £149 million at the end of 1951, compared with £133 million a year previously, and a large proportion of this will be spent this year.

Transport Tribunal Report

THE most notable task in 1951 of the Transport Tribunal, of which Mr. Hubert Hull is President, was perhaps the review of the Passenger Charges Scheme, 1951, submitted to the Tribunal under the Transport Act, 1947. Government action in suspending the fare increases recommended by the Tribunal to take effect from May 1 on British Railways outside the London Area, whilst permitting the recommended decreases to take their course from that date, and the fulfilment from March 2 of the Tribunal's recommendations as to fare increases within the London Area, have gone far to stultify the Scheme. The report of the Tribunal for 1951, however, gives some idea of the intricacy of the task, and the unwieldiness of the machinery for reviewing transport charges.

The British Transport Commission submitted the draft Scheme on April 7, 1951. In response to the Tribunal's notices of the Scheme, 204 objections were lodged. It was necessary first to decide which objectors were qualified. The main inquiry began only on October 8, and ended on December 3, having sat on 32 days; 99 objectors were heard, and 180 statistical tables and other documents were

considered. The Tribunal's conclusions were published on January 17, 1952, and the Scheme itself was confirmed on February 21, nearly eleven months after presentation.

Increases in railway, dock, and canal freight charges were recommended by the permanent members of the Tribunal, consulted by the Minister of Transport in accordance with statutory machinery, on April 6, namely a flat increase of 10 per cent, which took effect on April 16, 1951; and on December 3, 1951, of 10 per cent., with certain exceptions in the case of the railways, effective from the New Year. Other activities of the Tribunal in relation to freight charges were the hearing of over 1,600 unopposed applications for approval of agreed charges under Section 37 of the Road & Rail Traffic Act, 1933. The Tribunal made 1,433 Orders approving agreed charges, a large proportion of which were designed to eliminate unnecessary clerical work. The transfer to the Transport Tribunal from August 15, 1951, of the jurisdiction formerly exercised by the Road & Rail Appeal Tribunal, caused a number of appeals to be heard by the former.

In the light of the Railway Freight Rebates Regulations, 1950, which came into operation on January 1, 1951, which provided *inter alia* for the termination as respects the B.T.C. of the system of rebates provided for by the Railway Freight Rebates Enactments, 1929-43, the winding up of the Railway Freight Rebates Fund, and the payment to the Commission of the balance standing to the credit of the fund, the Tribunal decided that no useful purpose would be served by reviewing the operation of the Railway Freight Rebates Scheme during the year ended September 30, 1951.

The jurisdiction of the Tribunal was invoked during the year by local authorities and residents regarding the closing of the Newburgh and St. Fort branch, Scottish Region. The matter had previously been the subject of proceedings in the Court of Session, where the interim interdict against closing, which had been granted on June 30, was recalled on December 20, 1950, the Court holding that the complaint was a matter for the Transport Tribunal. The application made to the Tribunal was withdrawn on May 8, 1951.

Railway Rehabilitation in the Colonies

TWO papers presented this week at the Conference on Civil Engineering Problems in the Colonies, held at the Institution of Civil Engineers, offered to engineers in other branches of industry many examples of the resourcefulness and improvisation so often demanded of the railway engineer overseas. The circumstances described were somewhat different. Mr. E. J. B. Gahan's account of relaying in Nigeria dealt with a scheme necessitated by heavy wartime traffic, while Mr. H. Gatford described the rehabilitation of the North Borneo Railway after wartime conquest and reconquest had reduced it to a condition in which its removal and the use of the formation as a main road were seriously considered.

Relaying on the Nigerian Railway was the subject of a programme drawn up in 1935 and revised in 1938, but subject to delay in implementation. There was therefore no justification for the criticism heard in this country after the war that the Nigerian Railway had ordered locomotives too heavy for its track, for the standards of 80-lb. and 60-lb. rails had already been adopted. Mr. Gahan's paper described, among other work, the relaying of the Jebba-Minna section (162½ miles) with 60-lb. Revised British Standard rails and hardwood sleepers. Heavy wartime traffic had caused rapid deterioration of the track, which was due for re-laying in 1941. Steel sleepers had been in use before, but as neither plant for reconditioning them nor replacements were available, the decision to use hardwood sleepers of local origin was taken. An order for 370,000 sleepers was placed with the Forestry Department, which had been advocating their use to the Chief Engineer of the railway but had not previously dealt in batches of more than 10,000.

At the height of the re-laying work the labour force was 700 men for all purposes, but progress averaged less than 4 miles of track per month. With the cheap labour em-

ployed, output was slow and waste of labour difficult to control, while heavy demands on the railway's resources in other directions made the supply of materials and locomotive power erratic. Experience on this section led to the development of a system for re-laying pre-assembled track on the Zaria-Kano section of the railway, and subsequently the same methods have been used between Jebba and Offa. They are described and illustrated in Mr. Gahan's paper, which deals also with the conversion of steel sleepers from lug type to clip type; curve correction and maintenance; and training schemes for African permanent way staff on the Nigerian Railway.

The paper by Mr. H. Gatford on "Rehabilitation of the North Borneo Railway" opens with a description of the wartime fortunes of the railway after the Japanese landing on January 3, 1942. Under Japanese control the administration proceeded fairly smoothly, but among the outdoor and workshop staff discontent at petty tyrannies led to minimum work, frequent disappearances into the jungle, and sabotage. The effects of the consequent neglect of railway installations were crowned by the later allied bombing and the fighting during reoccupation of the country. At the time of reoccupation no locomotives and only 15 vehicles were sufficiently serviceable for use by the Australian forces, compared with the stock of 13 locomotives, 4 railcars, 34 coaches, and 161 wagons in 1942. An interesting section of Mr. Gatford's paper describes the changed economic conditions in the country since the war and the consequent shortage of labour for railway purposes. World demand for rubber has brought unprecedented prosperity to the tappers, and keen competition for other labour, with rising costs.

These factors have naturally upset the estimate of £480,000 for rehabilitation work made in 1949. By September last year the railway had received all the 60-lb. flat-bottom rails required for re-laying 23 miles of main line. Work on seven narrower bridges was completed within the year but was still in progress on the Papar River bridge of four 100-ft. spans. On the motive power side the railway now has nine steam locomotives in service, two Hunslet diesels of 134 h.p., and a Fowler diesel of 150 h.p. New traffic records have been created since the war as a result of the rubber boom and other factors, and to meet the growing demand for passenger transport four 6-seat Wickham railcars were received in 1948, followed in 1950 by two of 52-seat capacity.

Economy through Bridge Design

BRITISH RAILWAYS incur an annual expenditure of some £2,750,000 on the examination, repair, and renewal of bridges, culverts, and tunnels. Of this, about £2,250,000 is spent on the examination, repair, and painting of these structures. Some of the methods adopted by the civil engineers to reduce this expenditure, by curtailing the cost of bridge assembly, maintenance, and repair, were outlined in "Economy through Design," by Mr. P. S. A. Berridge, the fourth introductory note to "Economy in Railway Civil Engineering," which was the subject discussed at the Institution of Civil Engineers on November 13, 1951.

After describing undesirable features in some existing girder bridges that have proved costly to maintain, the note indicates the trend of modern design of bridge superstructures. This sets out to prolong the life of the structure by guarding against deterioration caused by such defects as the working of joints in connections initially weak, and corrosion in parts of the steelwork inaccessible to the paint brush.

In a series of diagrams the relative costs of a number of types of superstructure in double-track underline spans are compared. The types included are of steel, reinforced concrete, and pre-stressed concrete, or a combination of these materials, and the forms of construction are arranged in three series of diagrams (1) 10-ft. spans, (2) 40-ft. deck-, and (3) 40-ft. through-type spans. In each case the comparative costs of the following items are shown:

fabrication, concrete work, erection, waterproofing, and subsequent maintenance during a life of 55 years, the average age based on past experience and taken for accounting purposes. Though seldom permitted in this country, open-deck spans are included in each series, for the following reasons given by the author, with which we agree. In all cases they are the cheapest type, both in first cost and maintenance. Also, in these days of urgent need to curb capital expenditure, they might well be used on branch lines, as indeed they are on all classes of line in many other countries, without appreciable menace to safety.

In the 40-ft. spans, the steel-plate floor is the most costly in both prime cost and maintenance. For deck-type spans, longitudinal pre-cast pre-stressed concrete beams—a development of the form of construction used in the Adam Viaduct, and described in our September 26, 1947, issue—are the most economical. It is preferable, however, for the beams to be post-tensioned on either the Freyssinet or Lee-McCall system—the whole is post-tensioned transversely after erection—rather than pre-tensioned, which requires additional work on the top to spread the load transversely over the span. Where longitudinal pre-cast pre-stressed concrete beams would be awkward to handle on site, however, a deck-type span with steel girders and pre-cast reinforced concrete well-deck units resting on the top flanges is favoured. This was the form of construction adopted for the 60-ft. spans in the bridges between Berwick and Edinburgh reconstructed after the floods of 1948.

In through-type spans where depth of construction permits relatively deep cross-girders to be used, an economical floor can be designed with pre-cast concrete jack arches resting on concrete skewbacks pre-cast on the bottom flanges of the cross girders. Where construction depth is restricted and when conditions allow the concrete to be fully matured before the completed span is rolled into position, a type of floor often used is one consisting of transverse rolled steel beams, spaced at about 2 ft. 8 in. centres and incorporated in concrete reinforced with longitudinal bars passing through the webs of the beams.

An important aim of the designers is to minimise the amount of site work necessary during the assembly of a span. With this object an interesting flooring of primary and secondary reinforced concrete units has recently been evolved. The primary units each include a pair of steel cross-girders spaced about 6 ft. apart and joined by steel stringers. They are connected with high-strength bolts to stiffener brackets on the main girders. These primary units are not continuous, and secondary R.C. units, with longitudinal reinforcement, span the gaps between them. A still more recent design likely to prove even more economical incorporates pre-cast pre-stressed concrete units spanning between welded plate-girders. The pre-stressing bars are anchored to steel channels reinforced with thickening plates welded to their webs, which form the ends of the units adjacent to the main girders. Here also the site connections between the deck units and the main girders are made with high-strength bolts. These bolts pass through angle cleats welded to the channels near their ends, and secure them to the tables of T-shaped stiffeners on the main girders.

An economical form of road overbridge to span a double-line railway has also been designed with pre-cast pre-stressed concrete beams. These are of two types (a) pre-tensioned and used—as in the new bridges on the Sheffield-Wath electrification—in combination with *situ*-poured reinforced concrete, or (b) made with one of the post-tensioning methods and with the transversely-arranged post-tensioning carried out after erection. As the note points out, some saving may be expected if high-tensile steel is used in plate-girders over 85 ft. in length, provided that the cost of this steel and its fabrication is not more than 38 per cent. greater than the cost of mild steel. By ensuring that all steelwork surfaces are accessible for scraping and painting, the designer can also prolong the life of girder bridges.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Branch Line Services

June 4

SIR,—Might an appeal be put through your columns for a ban on further closing of branch lines and wayside stations, at least until the new Transport Bill becomes law and until the new national fares scale is agreed, as both may have their effect on traffic?

I observe that one of the latest closures announced is that of the Bulford branch on June 30; this was only to be expected as the recent service had consisted of but one train a day in each direction. This is one branch that one might have thought could have been made to pay. It served the not unimportant country town of Amesbury and large military camps around Bulford; Boscombe Down Aerodrome is also quite close to Amesbury. All the stations concerned were reasonably well situated.

I have been interested in the renewed correspondence on Oxted line services. Rumour has it that some of the Sussex country lines may close, including the Three Bridges to Tunbridge Wells line. Traffic on this line has never been heavy, but it forms a useful cross-country link not well provided by any other service. I have often considered that East Grinstead has a poor service for a town of its size. It is a pity the pre-war rush-hour fast train to London via Three Bridges has never been reinstated, serving say Forest Row, East Grinstead, Three Bridges, and Horley only.

Yours faithfully,

J. B. LATHAM

18, Wheatsheaf Close, Woking

Steam Heating of Coaches

June 14

SIR,—The plea expressed in my letter in your May 23 issue for abandonment of steam heating in warm weather, suggests conversely, a still stronger request for adequate heating in cold weather. Considerable experience of British trains in winter indicates that much of the older coaching stock tends to be deficient in this respect.

As there are no longer problems like that of persuading steam to percolate to the twenty-sixth coach of a L.N.E.R. wartime train, warming all the compartments in the smaller contemporary rakes should be quite simple. In practice there are usually some "blind spots"; a whole coach, several compartments, or one only, may be unheated whilst all others are comfortable. This obviously arises from defects in the circuit, but why it is so common I do not know. It is also noticeable that a large number of compartment valves is out of order. In the last resort, travellers have had to perform gymnastics to preserve some animation.

To show what can be done in the depth of winter, I recall a foggy evening at the end of December several years ago, when a well-known train, leaving London 20 min. late, was compelled to spend some 175 min. over the first 30 miles. Crawling from signal to signal, the engine crew made amends by blowing plenty of superfluous steam back into the train. Their efforts were so effective that the travellers in a L.N.E.R. touring coach (a type which has a good reputation for heating, but no readily accessible means of regulating it), after opening all the windows, were forced to take off their coats and jackets as well.

Several possible improvements may be mentioned. The use of two heaters in the compartment in British Railways standard stock is a great advance; two are essential in the coldest weather, while one can be turned off when conditions are less severe. Better maintenance of older stock is apparently desirable. It is regrettable that a number of locomotives is not maintained in better steaming condition, as the fireman is encouraged to shut the train-heating valve when hard-pressed for steam.

The Great Eastern Railway used to point out with pride that it had fitted steam hoses to the front of its engines, so that, in reverse, they could warm empty stock while working it to the platform from Stratford yards. This facility is an advantage, but, during extensive experience of Liverpool Street, I have never seen it operated. Use of stationary boilers is also advantageous. Early morning trains originating at a depot where there is no such plant compared most unfavourably with those from another depot which, I understand, used a stationary boiler during the night.

Yours faithfully,

J. D. MANNION

12, Trinity Road, Chelmsford

Meals on Wheels

June 15

SIR,—I am very much afraid that your really delightful editorial on this subject is misplaced. The prohibitive charges for adults will prevent many children savouring the pleasures of a restaurant car because the parents will be unable to afford the high costs which they will be compelled to pay for their own meals.

In actual fact the restaurant car facilities should be used to attract passengers to the railways, and such facilities should not be expected to show a profit in themselves. Many of the world's railways show a loss on restaurant car operations but at least they are balanced by the additional traffic attracted to the railways.

The sooner the restaurant cars are handed back to the Railway Executive and divorced from the Hotels Executive the better; the former will not need to show a profit and, consequently, will be able to reduce the price of restaurant car meals.

These moves would undoubtedly attract more fare-paying passengers to the railways and the children would no longer be denied the delights and romance of a restaurant car, as envisaged so ably in your editorial.

Yours faithfully,

G. RICHARD PARKES

Montcroft, School Lane, Formby

The Ford Accident

June 6

SIR,—Perhaps any difference with Mr. Cray is more apparent than real. May one make a few remarks on the subject of the last paragraph of this letter in your issue of June 6.

Surely multiple-aspect signals give, in effect, full braking distance plus an overlap. A two-aspect distant gives a warning at one point only, leaving a driver guessing afterwards. Subsequent multiple-aspect signals continue, modify, or cancel that warning.

How the driver of the second train came to overrun the inner home at Ford will never be known; had the outer home cleared only to a restricting yellow instead of the full green the difference should have made him more careful and corrected any mistaken impression (of which there is no evidence) that the train ahead of him was safely shut in the trap, giving him a clear run.

The difference is not with the distant but at the subsequent signals. A yellow demands caution as the next signal may be red, but the green of two aspect has no reference to the next signal, and therefore there is more warning and easier driving.

Yours faithfully,

COURTENAY BARRY

The Old Manor, Salisbury

THE SCRAP HEAP

St. Pancras Legend Variant

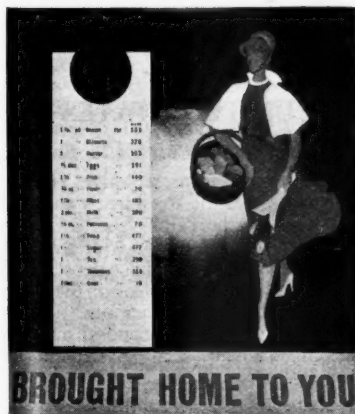
The saying "St. Pancras Station once stood on Mapperley Hills," to which we referred in "The Scrap Heap" in our January 4 issue, is disputed by a correspondent to "John o' London's Weekly" who says that "Mapperley Hills" should be "Butterley Hill. "Go and look at the feet of the huge arches that support the station roof," he writes. "A casting informs you that this mighty roof was made at Butterley by the Butterley Co. Ltd. . . . In 1909 he entered the service of the company and had to take a short cut across a field adjoining the works. He says that in that field the company erected the St. Pancras Station roof—"a gigantic affair for those days—to make sure that every item fitted perfectly. . . . I never pass that spot on Butterley Hill without thinking of the steel skeleton that must have looked so strange to the country-folk then."

Food Fares

A life-size cut-out of a housewife with shopping basket was the central feature on the British Railways stand at a recent Homes & Gardens Exhibition in Hull. It drew attention to a table showing how little the cost of transport affects the price of food as demonstrated by the distances various items are conveyed for one penny, namely:—

	Miles
1 lb. of bacon for	353
1 lb. of biscuits for	328
1 lb. of butter for	353
½ doz. eggs for	291
1 lb. of fish for	140
½ st. of flour for	70
1 lb. of meat for	182
2 pt. of milk for	200
½ st. of potatoes for	70
1 lb. of soap for	477
1 lb. of sugar for	477
1 lb of tea for	250
1 lb. of tomatoes for	328
1 cwt. of coal for	18

No doubt the table was also an intro-



Food transport costs illustrated in a British Railways exhibit at a recent Homes & Gardens Exhibition in Hull

duction for many visitors to the mysteries of railway charges, with their favoured treatment of soap and sugar compared with biscuits, butter and tea.

Shunter's Excursion

Engine-driver Kenneth Muilenberg and fireman Joe Mekus took their shunting engine for a 30-mile midnight trip across the prairie. They got on the wrong railway and held up the other company's trains. Reason for the trip: "They were bored." Result: Sack for the driver, suspension for the fireman. —From the "Daily Express," quoting an Associated Press report from Des Moines.

Restaurant Car Meals

I refuse to believe that persons travelling at their own expense will long be content to pay 7s. 6d. for a lunch or 5s. for a breakfast. It is all very well to say that the menu includes items like chicken or Dover sole. A perfectly simple two-course lunch which will avoid the unpleasant alternative of sandwiches in the carriage is quite enough. . . . The trouble is that the actual food accounts for only a small proportion of the 7s. 6d. and a small saving on it will be very little help. Substitution of buffet-cars, which need fewer attendants, on many routes seems inevitable. It is a bit of a pain to recall the excellent half-crown lunches on the old South Western, and a little later on the Great Western—the only time I remember the Great Western being second in any field. —"Janus" in "The Spectator."

Let's Ride the Railroads to a Fare-Thee-Well . . .

(From Information Bulletin No. 6 of the Centre D'Information des Chemins de Fer Européens:—

"In an important address given recently at the Rotary Club of L—, Mr. John E—, Chairman of the Railway Executive, described the present situation of the Blank Nationalised Railways.

"Blank Railways have won the winter freight battle," said Mr. E—. "By many standards Blank Railways are achieving steady success. For example, in spite of a reduction in train services in 1951, more passengers were carried last year than in any year since Blank Railways took over."

BALLAD OF THE SEVEN-FIFTEEN

Here's to success, boys, here's to success.

We've got fewer trains, boys, and soon we'll have less.

Think how our work-load and costs, boys, will fall,

When we've got to the stage, boys, of no trains at all.

Here's to low costs, boys, and here's to no load;

And here's to a fine way to run a railroad.

We've cut the main line down to one train a day,
But on the branch lines we have ten trains each way,
The branch trains don't go where the people expect,
But think of the large excess fares we collect—
All extra money that helps pay the rent
And cuts down our subsidy half a per cent.!

Here's to success, boys, here's to success! Etc.

We carry more passengers now every week.

To help us we've got just the gadget we seek.

The "Pushemin Rammer" we call the above

And it on-loads commuters two score at one shove.

(We have an inspector at work round the back

To catch any jokers who fall on the track).

Here's to success, boys, here's to success! Etc.

The Government's attention is drawn to the fact

That our coaches are still not effectively packed

And we could get more standing-room there, we find,

If only commuters were better designed. For instance, they'd give us the room

that we lack
With ankles in front, sir, and toes out in back.

Here's to success, boys, here's to success! Etc.

There's a new kind of language about, as you know,

Where "up" is now "down" and where "stop" is now "go."

A spade's not a spade now, at least we surmise,

It's a "little-man's Easiwork-dozer (small size)."

So we ask you, — and, mind, you don't have to say yes—

Does less service for more people now spell success?

Here's to success, boys, here's to success!

What we want is a new revolution, no less.

We want to find out how our costs, boys, will fall;

But we can't serve the public with no trains at all.

So here's to low fares, boys, and here's to railroads!

Here's to the old way to run the railroads!

—John Allan May in "The Christian Science Monitor."

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

PAKISTAN

Dieselisation Progress

The Ministry of Communications has so far authorised 60 diesel-electric locomotives for the North Western Railway and 69 for the Eastern Bengal Railway. Of 23 broad-gauge diesel-electric locomotives ordered for the N.W.R. from the American Locomotive Company, two passenger locomotives were received on September 7, 1951, and 12 on February 15 last. The remaining nine goods locomotives are expected this month.

Orders have been placed for 40 metre-gauge diesel-electric locomotives for the Eastern Bengal Railway. Five are expected to be delivered in September, 1953, and the deliveries of the balance of 35 will begin in January, 1954, at the rate of four locomotives a month; the whole order will be completed by September, 1954.

To meet immediate power requirements on the Eastern Bengal Railway, an order has been placed in Japan for 25 "YD" class 2-8-2 oil-burning locomotives. Delivery will begin in September, 1952.

The boilers of a large number of "MAWD" type 2-8-2 locomotives, which were built in wartime to last for four or five years, are being replaced. An order has been placed for 45 more boilers of different types. Steps have

been taken to provide necessary training in Pakistan and the U.S.A. of the staff engaged in diesel-electric traction.

Provision has been made in the Budget for 1952-53 for machinery, plant and equipment required for diesel-electric locomotive repairs on the North Western Railway. Similar arrangements are being made on the Eastern Bengal Railway.

NEW ZEALAND

Subsidy for Railways

The railways had an operating loss of £1,202,488 during the financial year ended March 31 last. This has been met by a Government subsidy from the Consolidated Fund. Railway revenue for the year was £23,248,412. The tariff for the carriage of goods was increased in December and passenger fares were raised in March, but these increases were not sufficient to close the gap between revenue and expenditure.

QUEENSLAND

Link with Northern Territory

The drought in the Northern Territory and the great losses in livestock which it has caused have stressed the need for building railways from the Territory into Queensland. Mr. J. E. Duggan, the Minister of Transport, has

pointed out that it is not practical economics for Queensland to construct such lines. "As always happens in times of crisis," he said, "immediate action is urged. Unfortunately the railways could not be built in a hurry."

Mr. Duggan said that attention had been focused on the following rail links:—Dajarra-Camooweal, 158 miles; Yarak—Windorah, 102 miles; Quilpie—Eromanga, 62 miles; Dajarra—Boulia, 90 miles. The cost of these lines would average £A36,000 a mile and would total £A14,832,000.

The scheme would not be complete unless a line was built by the Commonwealth Government from Camooweal extending to Birdum in the Northern Territory, 487 miles, at a cost of another £A15,000,000. Rolling-stock would cost another £A1,360,000.

Mr. Duggan pointed out that these lines would not pay interest, nor would they pay working expenses. On the Queensland section of the lines alone, the interest charge would be £A593,280 a year.

CANADA

Advantages of Diesel Traction

A full day may be saved in the movement of freight between east and west when sufficient diesel locomotives are made available. Mr. A. J. Lomas, Vice-President, Canadian National Railways, has said.

Diesel power has helped to improve operating efficiency. The C.N.R. last year provided 50 per cent. more freight transport with 12 per cent. fewer locomotives and more than 12 per cent. fewer wagons than in 1928, the peak pre-war operating year. It handled this increase with a 23 per cent. increase in average speed.

Diesels offered two great advantages which should benefit both the railway and the consignor, continued Mr. Lomas. One was improved efficiency, and the other substantial savings in both operating and servicing costs.

UNITED STATES

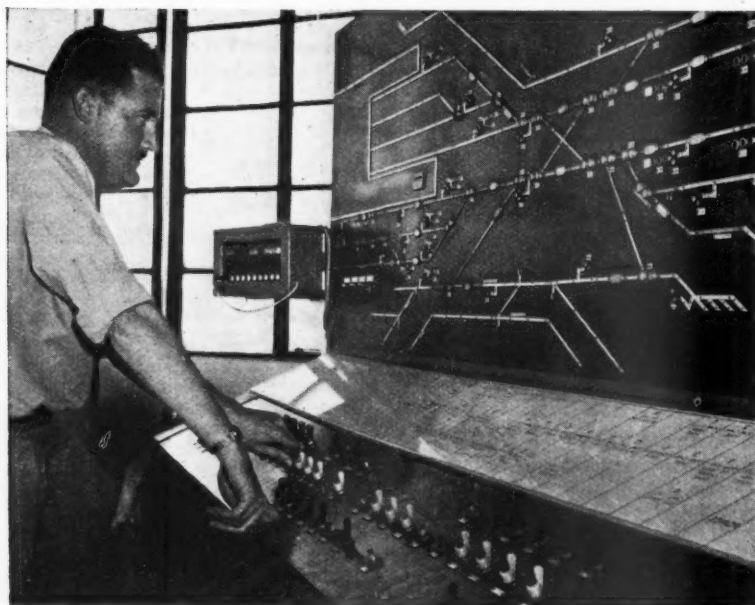
Presidential Control to End

The House of Representatives voted on June 11 to end the President's authority to take over the railways in an emergency. To avert a nation-wide strike the railways were placed in August, 1950, under the technical control of the Army until last month, when the railway unions accepted a settlement proposal made by the Government, as recorded in the May 30 issue.

Season Tickets on the Illinois Central

On the south side of Chicago the Illinois Central Railroad conducts one of the most intensive electric suburban passenger services in the country. Since a recent

Relay Interlocking at Bulawayo



New relay interlocking panel at Bulawayo, Rhodesia Railways (see our May 30 issue.) The panel was constructed locally, and incorporates components supplied for the whole of this installation by the Siemens and General Electric Railway Signal Co. Ltd.

authorisation by the commissions concerned of an increase in suburban fares, it has introduced some interesting variations of the ordinary season ticket. Previously the types of ticket issued to "commuters" were two—a monthly ticket valid for 60, 54, or 48 journeys (according to whether the holder desired to travel seven, six, or only five days a week), and a weekly ticket valid for 12 journeys; the appropriate space was cancelled by the conductor's punch on each journey.

The company is now issuing monthly and weekly "seasons" of the British type for an unrestricted number of journeys. They are non-transferable and must be signed by the holder. There is also a "restricted" monthly season, not valid on Saturdays, Sundays, and certain public holidays, for those working a five-day week only.

A new and ingenious type of ticket now being issued, designed for family use, is the "Twin-25." This is actually two tickets, each valid for 25 journeys, which can be detached from each other and used by different persons without limit of transferability over a period of two months. If desired, either half can be used by a party, the appropriate number of ride coupons being cancelled.

ARGENTINA

Diesel-Electric Locomotive Plant

A plant for manufacturing diesel-electric locomotives required for the national railways is to be created under the name of Fabrica Nacional de Locomotoras

(Fadel). The works, which will be under the management of Mr. P. Saccaggio, will be subordinated to the Ministry of Transport.

ITALY

Direct Current Replacing Three Phase

On two State Railway lines in the north, d.c. traction replaced three-phase traction on May 18. One is the 34-mile section between Trento and Bolzano of the Verona-Brennero double-track main line, the other is the single-track standard-gauge secondary line between Bolzano and Merano, approximately 20 miles long. The Verona-Trento-Brennero line was electrified between 1929 and 1934, and the Merano branch in 1934; for both 3,700 volt a.c., three-phase, 16½ cycles, was adopted.

The conversion of the two lines to 3,400 volts d.c. is part of the scheme for the gradual conversion of all State Railway lines still using three-phase current. It is estimated that despite the increased and faster services made possible by the d.c. system the annual saving from the conversion of these two lines will total about lire 50,000,000 (approximately £28,200), recouping the cost of conversion within a few years.

FRANCE

Zonal Centres

In the April 11 issue reference was made to the opening of zonal centres by the S.N.C.F. The Minister of Public Works & Transport granted authority

provisionally for the opening on May 18 of eight new centres, but, before this order is confirmed, the S.N.C.F. must submit to the Minister a scheme showing the general organisation of the new centres, with particular reference to the operation of the terminal services. The Minister will then judge whether the arrangements are in the national interest.

New Cherbourg Harbour Station

Monsieur Antoine Pinay, the Premier, accompanied by Monsieur André Morice, Minister of Public Works & Transport, officially reopened on May 22 the reconstructed harbour station at Cherbourg. The official party, including representatives from the British and American Embassies, travelled from Paris by special railcar. The Premier, after an inaugural address at a banquet, attended a reception on the *Queen Mary*, when it drew up alongside the quay in the afternoon.

Conditions of Motorcar Conveyance

The S.N.C.F. has submitted to the Minister of Public Works & Transport for approval a proposal for the modification of the conditions under which motorcars and other petrol driven vehicles are conveyed by rail. It is suggested that motorcars should be accepted with petrol in their tanks provided that the tanks are quite sound, and that, if the petrol runs from the tank by gravity, the taps are turned off in accordance with the regulations covering the conveyance of dangerous goods.

Publications Received

Examples of Structural Steel Design (Part 3). By V. H. Lawton, M.I.Struct.E. London: The British Constructional Steelwork Association, Artillery House, S.W.1. (B.C.S.A. Publication No. 4, 1951.) 11 in. x 8½ in. 24 pp. Illustrated with line drawings. No price stated. This is one of the B.C.S.A. publications giving examples of structural design to conform with British Standard 449:1948. The author submits suggestions for practical design of steel bases. Three examples are given—two stanchions each with single rolled steel joists and one stanchion with two channels battened, also a specimen design for a single-angle rafter for a roof truss.

Railway Electrification Booklets.—We have received from the English Electric Co. Ltd. three booklets describing and illustrating the company's equipment for multiple-unit trains on the L.M.R. Liverpool-Southport service, the Eastern Region Liverpool Street-Shenfield line, and the Polish State Railways suburban lines. All these publications give a brief outline of the type of service on the lines concerned and a description of the motors, control gear and other electrical apparatus for the rolling stock. They include motor characteristic curves and

main power circuit diagrams. In the booklet on the Polish electrification there is also a description of the substation and overhead line equipment, the latter having been supplied by British Insulated Callender's Cables Limited as a sub-contractor. The booklets present in a convenient form information of value to the operating and electrical departments of railways with conversion schemes in contemplation, as the equipment described embodies lengthy experience in the provision of electrified services for a wide range of suburban and main-line traffic conditions.

New Range of Torque Spanners.—An entirely new range of torque spanners, known as the Acratork MK.6 range, is described and illustrated in a leaflet issued by Acratork Engineering Co. Ltd., an associated company of Powell Duffryn Limited. The advantage of the design is that once the load is pre-set, it is only possible to exert another load similar to the previous one. Operation depends on a cam which rotates between ball races, having at one end a male square for attaching to the socket. Load is applied by coil springs pressing the roller down on the cam. The range of spanners varies from 0.3 lb./ft. to 36 in. spanners for 20-250 lb./ft. Extreme accuracy is claimed in that power generated was maintained

within 1 lb./ft. for some 100,000 operations at full load. Testing and setting rigs are supplied for torque loads up to 500 lb./ft. The firm is also developing a hydraulic type to generate torque loads from 500 ft./lb. upwards. World distributors are Cory Brothers & Co. Ltd.

Twin-Arc Welding Process.—A new 16-page brochure, No. T.C.854, describing the Twin-Arc process has been produced by the Quasi-Arc Co. Ltd. A full technical description is given of the Twin-Arc plant and Twin-Arc.R electrode, together with deposition data and instructions how to weld various types of joint. A list of typical Twin-Arc applications indicates the wide use of the process in many different branches of engineering.

Belgian Coast Holiday Guide. By C. A. Thompson. Ilford: Belux Publications, 44, Suffolk Road. 55 pp. Illustrated. Price 2s. 6d.—This is an excellent pocket-size guide to the many resorts, large and small, which fringe the sandy beaches between La Panne and Knokke-Zoute, the largest of them Ostend. It includes street plans and indexes, details of the coast tramway which serves the whole Belgian Coast, and much other information which will be of value to the intending visitor.

Running Through Curves

Effect of maximum speed on vehicle performance

(By a Correspondent)

EVER since speeds of 100 m.p.h. have been attained by railcars, it has been clear that economic considerations demanded high average, rather than occasional high maximum speeds. Not only are rapid acceleration and retardation essential, but vehicles must also be able to negotiate curves at high speeds, which is of particular importance for lines with many curves, as on many overseas railways.

The forces acting on a vehicle running in a curve are shown in Fig. 1. Here the centrifugal force f is applied at the

The maximum permissible speed is:

$$V_{max} = \sqrt{(R/4)(s + 3.7)} \text{ (m.p.h.)}$$

with $K = \sqrt{(s + 3.7)/4}$:

$$V_{max} = K \sqrt{R} \text{ (m.p.h.)}$$

The value of the constant K depends on the amount by which the super-elevation is smaller than required to balance the transverse force encountered at the speed concerned. Generally the values of K vary between 1 to 1.4, though 1.6 has been attained with railcars. More recently, Kreissig², pursuing

important than the "static" conditions considered above. The former embrace the forces and acceleration resulting from the elasticity of track and vehicle structure as well as from the variations of curve radius and superelevations. The curve radius is not usually constant over the whole length, and for the vehicle the difference Δc of the distance between chord and curve arc is of importance. This difference should normally not exceed 0.4 in. for every 65 ft. of the arc length.³ For an arc length of 100 ft. the value given by $\Delta c = 100/V$ should

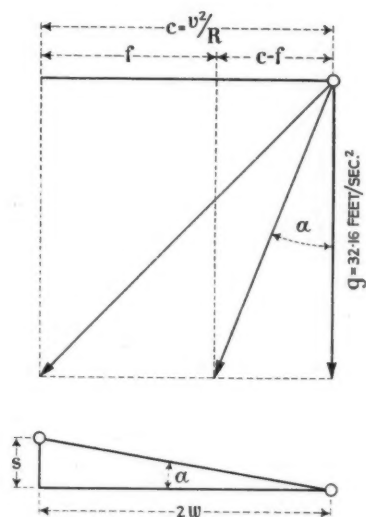


Fig. 1—Forces acting on vehicle in a curve

centre of gravity and results in an acceleration $a = v^2/R$, with a in ft./sec.², v in ft./sec., and R in ft. The transverse acceleration, which is balanced by the superelevation of the outer rail, is given by b , so that $f = a - b$ is the unbalanced force which must be dealt with by rail and wheel flanges. If $2w$ is the track gauge and s the superelevation, then $\tan \alpha = s/w$ and $f = a - gs/2w = (v^2/R) - 32.17s/2w$, or for V in m.p.h. and standard gauge, $f = (V^2/0.465R) - 32.17s/59 = (V^2/0.465R) - s/1.835$.

Experience has shown¹ that the maximum value of transverse acceleration should normally not exceed $a = 2$ ft./sec.² With this value $s = (3.95V^2/R) - 3.67$, or sufficiently approximate:

$$s = (4V^2/R) - 3.7$$

where s (in.), V (m.p.h.) and R (ft.).

The "balanced" speed at which the resultant of vehicle weight and centrifugal force will be at right angles to the plane of the track and $f = 0$ will be derived from

$$s = 4V^2/R$$

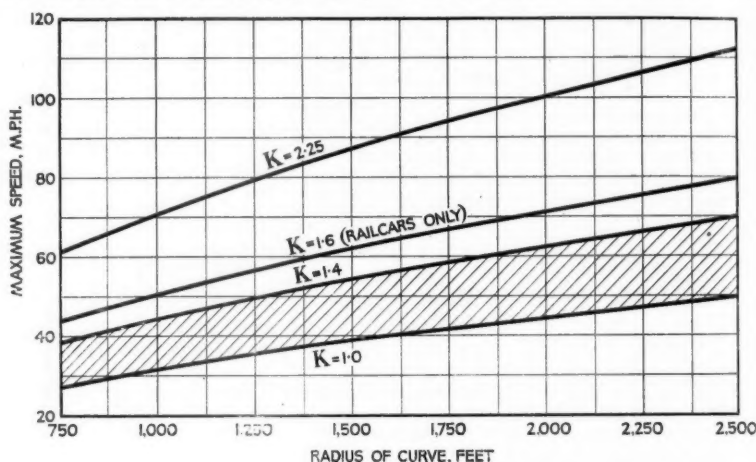


Fig. 2—Limiting values of speed through curves

the researches of Baeseler and Heumann, considers that a value of $K = 2.25$ should be aimed at with suitably designed railcars. The desirability of high K values will be gathered from Fig. 2.

The value of the unbalanced component of the centrifugal force is given by:

$$F^1 = M \times a = (nQ/2240/g) a = 75.9 nQ [(V^2/0.465R) - s/1.835] \text{ (lb.)}$$

where M is the mass of the vehicle, Q the axle load (l) and n the number of axles. This equation is useful in determining the influence of Q upon V for a given R , F^1 and s . Simplifying:

$F^1 = nQ(C_1 V^2 - C_2)$, where $C_1 = 75.9n/0.465R$ and $C_2 = 75.9ns/1.835$. Assuming now, quite arbitrarily, a value of $F^1 = 5,000$ lb. = const., it is possible to calculate the maximum speed at which this value will not be exceeded. The resultant values are plotted for the case of a bogie vehicle in Fig. 3 for three curves radii and s -values similar to those used by the Swiss Federal Railways.³ It will be seen from this that the effect of vehicle weight upon V is not as pronounced as might be at first expected.

As shown by Pflanz,⁴ the dynamic aspect of curve negotiation is more

not be exceeded, with Δc in inches and V in m.p.h. The force acting upon the vehicle due to irregularities of the curve radius is generally given by:

$$F_d = v \times \sin \alpha \times \sqrt{M_r/c}$$

where v in ft./sec. $\sin \alpha = 2\Delta c/l$ ($l = 0.5$ chord length), c the elasticity

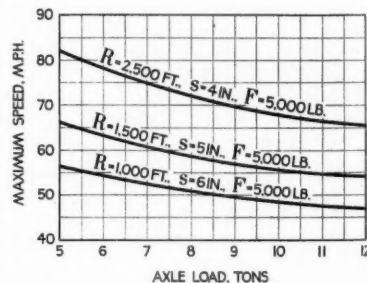


Fig. 3—Effect of axle load on speed through curves

of the rails, M_r , the mass of the vehicle reduced with regard to the point of impact. $M_r = M/(1 + d^2/r^2)$. Here M is the mass of the bogie, d the distance

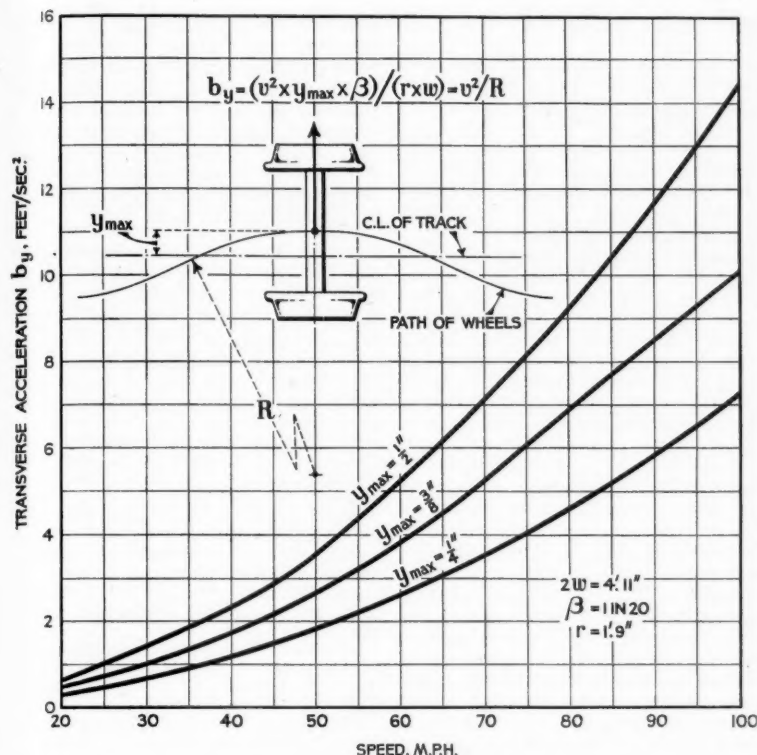


Fig. 4—Transverse acceleration of wheels in the straight

of the centre of gravity from point of impact, and r the radius of inertia of the vehicle. As d is equal to 0.5 wheelbase and $r^2 = M \times I$, where I is the moment of inertia of the vehicle, M , can be determined if I is known. For a power bogie of a railcar having an axle load of 10 t., it can be assumed that $I = 15,000 \text{ ft.-lb.-sec.}^2$, whilst the mass is $M = 700 \text{ lb.-sec.}^2/\text{ft.}$, so that with a 10 ft. wheelbase $r = \sqrt{15,000/700} = 4.63 \text{ ft.}$ and $M_r = 700/(1 + 5^2/4 \cdot 63^2) = 310 \text{ lb.-sec.}^2/\text{ft.}$ or 44.3 per cent. of the mass M .

The maximum value of Δc for a speed of 70 m.p.h. is given by $\Delta c = 100/70 = 1.425 \text{ in.}$, so that $\sin \alpha = 2\Delta c/l = 2 \times 1.425/50 \times 12 = 0.00475$. With $c = 0.04 \text{ in./t.} = 1.5 \times 10^{-6} \text{ in./lb.}$, the dynamic force will be $F_d = v \times \sin \alpha \times \sqrt{M_r/c} = 103 \times 0.00475 \times \sqrt{310/1.5 \times 10^{-6}} = 7,100 \text{ lb.}$

Transverse Flexibility

The analysis due to Pflanz shows that a reduction of the axle load is a far less important contribution to faster running through curves than design measures adopted to ensure sufficient transverse flexibility capable of dealing with irregularities in curves, thus reducing the dynamic forces. This applies particularly to high-speed vehicles, which are more sensitive to track irregularities; and with them a thorough study of bolster mechanics along the lines indicated by Borgeaud⁶ and Koffman⁷ is necessary if good riding qualities are to be obtained at high speeds. The result, particularly of Bor-

geaud's fundamental investigations into the problems of vehicle performance⁶ and design⁷, and his consistent application of the principles evolved has led to great advances in the design of electric and diesel-propelled vehicles.

Besides centrifugal force, the vehicle is subject to transverse acceleration b_y due to the sinusoidal movement of the wheels along the track resulting from tyre conicity. The value of b_y depends upon speed V , tyre conicity β , wheel radius r , the distance between the normal circles of rotation (59 in. for standard gauge) and the distance between wheel flange and rail y . The values of b_y max for 3-ft. 6-in. wheels are plotted as a

function of y_{max} in Fig. 4. Very high values are encountered at speed, and as the wheels follow their serpentine course through curves, the relevant values of b_y must be added to those of transverse acceleration due to centrifugal force. An effective way to reduce b_y is to maintain the axles of a bogie strictly parallel to each other; this will prevent the individual axles from pursuing their own

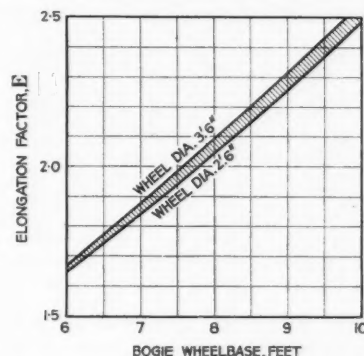


Fig. 5—Elongation factor according to Heumann

course and extend the length of the sine wave followed by the bogie and with it the value of R , the wave length of 1 of a single axle being increased to $E \times 1$. The value of the elongation factor E is plotted as a function of bogie wheelbase in Fig. 5 on the basis of theoretical considerations due to Heumann.⁷

The importance of attaining high speeds through curves will be gathered from the results of a typical performance analysis carried out for a 400-h.p. bogie railcar running single or with a bogie trailer. The car weighs 25 tons empty and 32 tons fully laden, the respective trailer weights being 18 and 25.5 tons. The tractive resistance was estimated in accordance with the equation:

$R = 4.5W + C_d \times 0.26A \times (V/10)^3$ (b.) where W (tons), V (m.p.h.), A the frontal area (sq. ft.) and C_d (—) the drag coefficient.

In the present instance C_d is taken

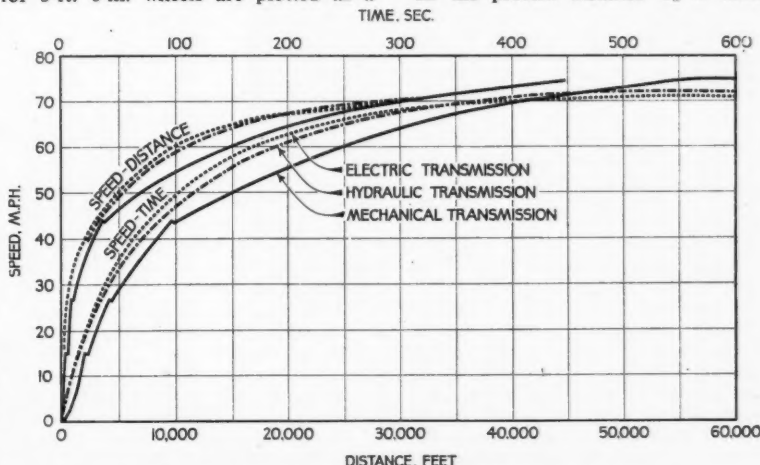


Fig. 6—Acceleration of a 32-ton 400-h.p. railcar

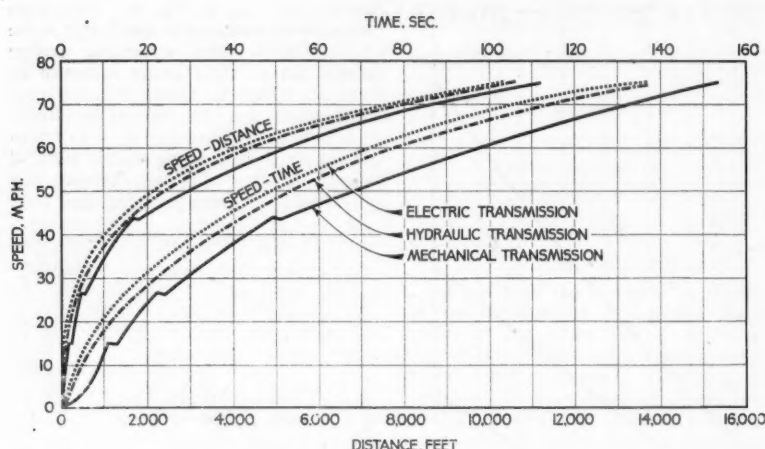


Fig. 7—Acceleration of railcar and 25.5 ton trailer

to 0.5 for the car alone and 0.75 for car and trailer.¹⁰ The maximum speed is limited to 75 m.p.h. on the level.

Time-Speed and Distance Curves

The resultant time-speed and time-distance curves for the single car and for

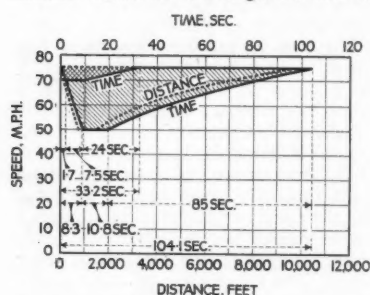


Fig. 8—Time lost by railcar due to slowing down in curve

the car and trailer are plotted for various transmissions in Figs. 6 and 7 respectively. With mechanical transmission, an allowance of 2 sec. was made for each gear change and the distance covered during, and the speed at the end of, each change was calculated by an analytical method dealt with elsewhere.¹¹

If the maximum speed of the vehicles passing through curves is to be limited to meet the requirement $K = 1.6$, then the speed must be reduced from 75 to 50 m.p.h. when negotiating a curve of 1,000 ft. radius. Assuming a coefficient of friction of 0.13, which is on the safe side,¹² the retardation will be 3 m.p.h.p.s. The speed will be reduced from 75 to 50 m.p.h. in 8.3 sec. (Fig. 8), during which time the vehicle will travel 770 ft. A 45-deg. curve will be negotiated in 10.8 sec. and after this the vehicle will accelerate again to its maximum speed. Here the time required depends very little on the type of transmission used in the higher speed ranges, being 85, 85, and 82 sec. for the mechanical, hydraulic and electric transmission re-

spectively, the corresponding distances being 8,600, 8,150, and 8,200 ft. Thus an average of 1 min. 44 sec. elapses before the maximum speed is attained again, and during this time the vehicle will travel some 10,000 ft. If use could be made of $K = 2.25$, then the speed would be reduced to 70 m.p.h. only. Consequently, only 33.2 sec. would pass before the maximum speed was attained again. This would mean that during the same time interval the car would gain 1.45 miles.

In the case of the car hauling the trailer, the estimates are based on a maximum speed of 70 m.p.h. As previously, the time required to reduce the speed to 50 m.p.h. and pass a 45-deg.,

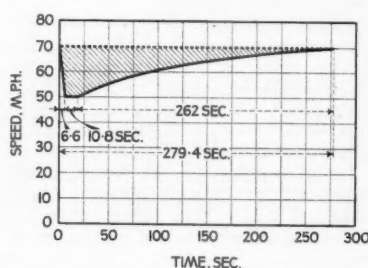


Fig. 9—Time lost by car and trailer

1,000-ft. radius curve amounts to 19.1 sec. In addition, some 262 sec. are needed to attain 70 m.p.h., increasing the total to about 280 sec. (Fig. 9). During this time the train will travel about 24,000 ft. In the case of $K = 2.25$, the curve could be negotiated without reducing the speed; one mile consequently would be gained in the same time interval. The difference is more pronounced on gradients, with the weight component of resistance.

Apart from the necessity of a correct determination of superelevations and transition curves, and the obvious necessity of ensuring the maintenance of these values throughout the years, the possibility of increasing K to 2.25 depends

mainly on the ability of the vehicle suspension to "digest" the deviations from the theoretically ideal curve requirements which will be present because of practical limitations. It is here that a consistent, logical development of suitable bolster suspensions and guided axle designs is needed to replace the sometimes rather arbitrary tendencies in design existing even today

¹ D. E. Protopapadakis, "Superelevation and Maximum Speeds as Function of the Radius of Curves and of Gradients." *Bulletin of the International Railway Congress Association*, May, 1948 (pp. 286-301) and Sept., 1948 (pp. 529-551).

² E. Kreissig, "Der moderne Triebwagen." *Verkehr und Technik*, Vol. 3, No. 7 (July, 1950), pp. 210-213, and No. 8 (Aug. 1950), pp. 244-246.

³ C. Bodmer, Dr. G. Borgeaud and A. Meyer, "Neueste Entwicklung der elektrischen Triebfahrzeuge, insbesondere Lokomotiven, bei den schweizerischen Hauptbahnen." *Schweiz. Tech. Zeitschrift*, No. 38/39, Sept. 25, 1947.

⁴ K. Pflanz, "Achsdruck und Fahrgeschwindigkeit im Gleisbogen." *Schweizerische Bauzeitung*, Vol. 65, No. 45 (Nov. 8, 1947), pp. 611-614, No. 46 (Nov. 15, 1947), pp. 623-627.

⁵ K. Pflanz, "Bogengeschwindigkeit von Schienen- und Strassenfahrzeugen." *Elektrische Bahnen*, Vol. 22, No. 2 (Feb., 1951), pp. 30-36.

⁶ G. Schramm, "Der Gleisbogen," pp. 149. *Elsner*, Berlin, 1943.

⁷ G. Borgeaud, "The Latest Development of the Electric Locomotive in Switzerland." *Journal Inst. of Loco. Engineers*, No. 208 (Mar.-Apr., 1949), pp. 121-224.

⁸ J. L. Koffman, "Some Aspects of Carriage Bogie Design." *Journal Inst. of Loco. Engineers*, No. 202 (Mar.-Apr., 1948), pp. 259-307.

⁹ G. Borgeaud, "Betrachtungen über einzelne Probleme des Kurvenlaufes der Eisenbahnfahrzeuge." *Schweiz. Tech. Zeitschrift*, 1944, Nr. 42-45.

¹⁰ G. Borgeaud, "Zylindrische Schraubenfedern bei nicht rein zentrischen Belastung." *Mirko Ros Commemorative Volume*. Vogt-Schild A.G. Solothurn, 1950.

¹¹ J. L. Koffman, "Tractive Resistance of Diesel Railcars and Locomotives." *Diesel Railway Traction*, Jan., 1950, pp. 5-8.

¹² Opatowski, "La Perte de Vitesse des Automotrices à Transmission Mécanique au cours du Changement de Rapport de Transmission." *Les Chemins de Fer et les Tramways*, Aug.-Sept., 1936.

¹³ J. L. Koffman, "Adhesion and Friction in Rail Traction." *Journal Inst. of Loco. Engineers*, No. 205 (Sept.-Oct., 1948), pp. 593-641.

GERMAN PATENT SPECIFICATIONS.—The City Librarian of Leeds announces that German patent specifications, delivery of which was suspended on the outbreak of war in 1939, are now being received again at the Library of Commerce & Technology. At the present time, numbers 800,001 to 815,938 are available for consultation. A gap between numbers 678,144 and 800,000 cannot be bridged, but arrangements have been made with the Patent Office in London for photostat copies of individual patents to be obtained at no cost when required. The library's service of lending patents to libraries or industrial organisations outside the city of Leeds on written request is being continued.

Palletisation of Stores Traffic on the French Railways

Developments at Sotteville and Nanterre General Stores

THE term palletisation normally suggests the use of pallets for the movement of a trader's merchandise, but that there is also a fruitful field in the conveyance of a railway's own stores traffic is made clear by the experience of the French National Railways during the past few years at Nanterre and Sotteville General Stores in the Western Region.

Since early 1949, the S.N.C.F. has been making a detailed study of the methods used at its stores for handling and stacking railway materials, and considerable attention has been given to improved handling methods; packing and dispatching supplies in less-than-wagon-loads from the General Store at Nanterre, near Paris, to stations and workshops in the Western Region; storing and handling bulky items, such as fire-arch bricks and ingots at the General Store at Sotteville, near Rouen.

It is the responsibility of the Nanterre Store to maintain stocks of a wide range of materials, including stationery, clothing, lighting appliances and accessories, pneumatic tyres, tools and the lighter types of handling equipment. Issues are made on a comparatively large scale to eight stationery stores and thirteen main workshops throughout the Region, at such places as Rennes, Caen, Rouen, Paris, Le Mans, Nantes, and La Rochelle. Small-scale

distribution is also made from this depot to some 850 repair shops and stations.

At present the greatest attention is being devoted to improving the methods of handling the large-scale issues to stationery stores and main workshops, although the smaller-scale consignments are not being neglected. As most issues are made in less-than-wagon-load consignments, it is essential for the utmost care to be taken in packing the materials before despatch from the store.

Until the end of 1948, it was the practice to maintain one central packing room at the Nanterre Store, and issues effected in the different sections of the store were sent to this central department to be packed and despatched. Stationery, clothing, and all the light items were packed into large baskets, but heavy articles were despatched in wooden boxes, each basket or box accommodating a load of approximately 2 cwt.

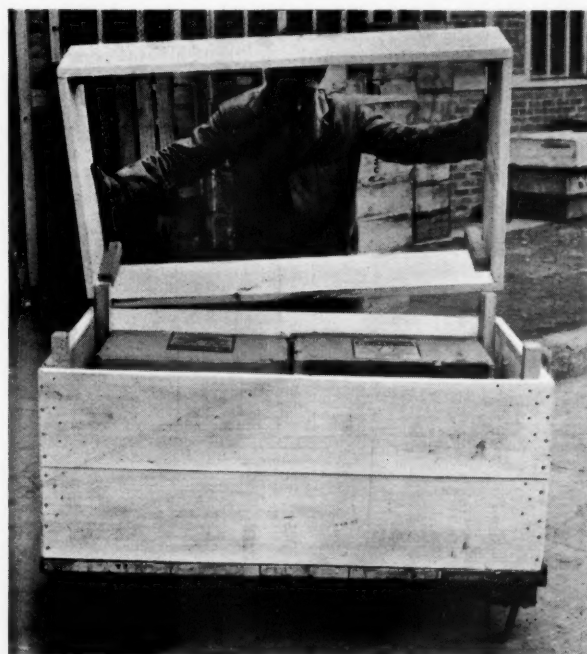
At the price level which was then ruling, it cost the Nanterre Store some fr. 300,000 (£300) a year for repairs to baskets and boxes, and for the purchase of new ones; this figure would now be considerably higher. There were many disadvantages of this method, principally the comparatively large number of packages required for handling the larger consignments, the

storage space occupied by the empties, and the labour engaged in their movement within the store.

Use of Skids

The new handling methods introduced at Nanterre involve mainly the use of what can be called semi-live skids. They consist of a wooden platform approximately 2 ft. 5 in. by 4 ft. 3 in. supported at one end by a pair of wheels, each 7.87 in. in dia., and at the other end by two skids which normally ensure a clearance above ground level of approximately 8.66 in. Standard-sized packages are stacked directly on the skids and secured with steel strapping.

For fragile goods and non-standard-sized items, sectional boxes and containers have been designed. The boxes are built up in sections on the semi-live skids, and when they are of the required height, a lid is placed on top and the complete load is secured to the semi-live skid with steel strapping; each box section is 9.45 in. deep. The containers, including the skids on which they move, which are basically similar to the semi-live skids already described, are constructed in one piece, and have an internal depth of 4 ft. 7 in.; their capacity is slightly more than 35 cu. ft. The empty weight of a container unit is 3 cwt., and its cost, early in 1951, was fr. 16,000 (about £16 at the 1950 rate of



Semi-live skid being fitted with sectional boxes for the conveyance of fragile goods from S.N.C.F. general stores



Five sectional boxes fitted on semi-live skid, complete with lid secured to load and skid by steel strapping



Loaded pallet being moved into position by hand pallet truck

exchange). From the accompanying illustrations it may be seen how the sectional boxes and containers are assembled and loaded.

It has been necessary to make available to all stores and workshops handling semi-live skids and containers the means of moving them about the premises, and into and out of wagons. A form of lifting unit has been devised which consists of a two-wheeled trolley, between the wheels of which is a ball-shaped projection which clips into a cup-shaped fixture on the front of each semi-live skid or container. The cost of the lifting unit at the end of 1950 was approximately fr. 4,500, or about £4 10s. in British currency.

Where a loading platform is available, the use of a lifting unit enables skids to be wheeled directly into and out of a wagon. This type of traffic is always loaded in covered wagons, and the skids and containers are so designed that they can be loaded three abreast across the normal French covered wagon. Often, however, no loading platform is provided at S.N.C.F. workshops, and even where a platform is available, it is sometimes more convenient to load wagons at other points in the workshop. The Western Region has therefore developed other methods of handling semi-live skids and containers into and out of covered wagons.

Fork-Lift Trucks

When a fork-lift truck is available, no difficulty arises, and the skid is moved laterally through the wagon door. Inside the wagon and on the shed floor it is moved by the lifting unit. Some thirty workshops on the Western Region are equipped with the Fenwick KF-202 standard truck, an electrically-driven truck fitted with a lifting platform of 2-ton capacity. Where the design of the semi-live skid

affords sufficient clearance for the entry of the lifting platform of a Fenwick truck, the platform of the truck is used in the same way as the forks of a fork-lift truck, and the skid lifted up; to put it down inside a wagon (or to pick it up from the floor of a wagon), the base of the Fenwick truck runs underneath the wagon.

Where the requisite clearance is not available, a method has been devised whereby extension forks can be quickly fitted on the platform of the Fenwick truck, permitting the skid to be moved laterally into or out of the wagon as with a fork-lift truck. One disadvantage of this method is that the load overhangs, and, if it is heavy, there may be insufficient weight on the driv-

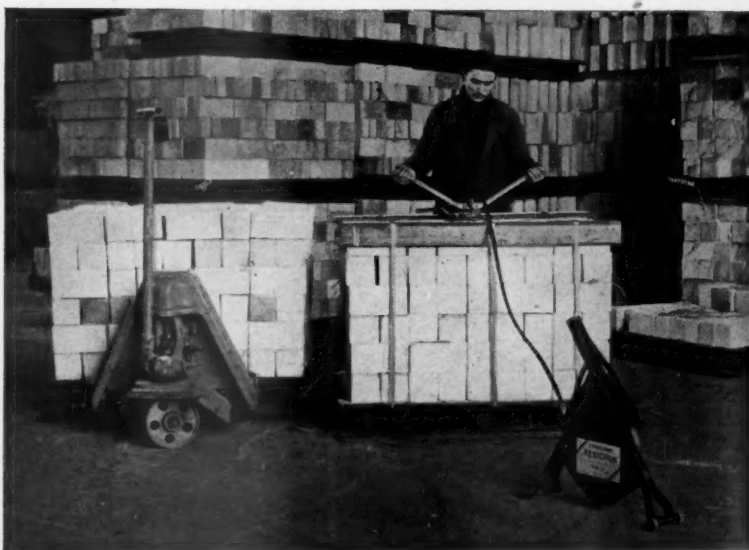
ing wheels and a lack of manoeuvrability. It is seldom that semi-live skids and containers have to be handled without either a loading platform, a fork-lift truck, or a Fenwick standard truck being available. Should all of these be lacking, however, a hoist is erected, and the skids are then lowered or raised over a ramp.

Considerable advantages are claimed by the Region from the use of semi-live skids and containers. The most important are the reduction in packing time, the quicker loading and unloading of wagons, and the almost complete elimination of loss and damage; the last-mentioned is, in particular, a great aid to efficiency. There is a saving in time of some 70 per cent. in the loading of one ton of stores into a container instead of into ten crates and boxes. During the first eighteen months of the operation of the scheme, 25 skids and a similar number of containers were in service; each averaged some forty round trips and their cost of maintenance was almost negligible.

Every effort is being made at Nanterre to reduce the use of wooden boxes for the despatch of consignments not sufficiently large to justify the exclusive use of a semi-live skid or container. Whenever possible, expendable fibre-board cartons are used, and the return of empty packages is thus avoided. When cartons are being despatched to different consignees at the same station, they are usually loaded on to a semi-live skid fitted with sectional boxes.

Stacking and Handling at Sotteville

Some 5,000 tons of fire-arch bricks are handled annually in and out of store at Sotteville. Formerly, this traffic was loaded and unloaded with the aid of hand trucks, and the bricks were stacked manually in the store to a maximum stack height of 12 ft. This material is



Load of fire-arch bricks being attached to a pallet by steel strapping. On the left a second load is seen on a hand pallet truck

now being handled on pallets with the help of fork-lift trucks; the pallets at present in use are of the one-ton double-faced non-reversible type, measuring 3 ft. 6 in. by 2 ft. 11 in., and with a clearance between the decks of $3\frac{1}{2}$ in.

Considerable difficulty in the development of the new handling method has resulted from the impracticability of using the American type of fork-lift truck inside wagons because of its weight and size. Until comparatively recently, mechanised means of handling could only be used in the store itself, and it was the practice to unload wagons by passing bricks manually through the wagon door and stacking them on a pallet alongside the wagon.

With despatches from Sotteville, the reverse procedure was carried out. An electrically-powered fork-lift truck was used to move the pallets about the store, and to stack them to a maximum height of 12 ft. Even on this basis there was, after allowance had been made for the maintenance of the trucks and the cost of electric power, an estimated saving of 60 per cent. in handling costs in comparison with the earlier method of handling.

Use of Hand Pallet Trucks

It was clear that the full benefits of palletisation would not be obtained until it was practicable for the fire-brick bricks to remain on the pallets both in the store and in the wagons. It was therefore decided to attempt to develop a hand pallet truck to work in association with a fork-lift truck. Such a truck would make it possible for loaded pallets to be placed inside the wagon doorway by a fork-lift truck, the hand pallet truck then picking up the load and moving it as required inside the wagon. Alternatively, where the stack was close to the wagon, the pallet could be moved entirely on the hand pallet truck.

The first experiments were made with an American type (Yale) hand pallet truck, known as the J20 R.P. model, and built under licence in France by the Fenwick Company. This truck is equipped to lift and move a standard 42 in. by 40 in. double-faced pallet. The early experiments were not altogether successful, mainly because of the difficulty of moving a truck with 3-in. dia. wheels on the comparatively soft wood on a wagon floor.

Even when they are newly installed, wagon floorboards may vary in thickness by as much as 0.16 in., and after renewals have been made during service the differences in level may amount to as much as 0.5 in. In addition, there may be gaps between boards of up to 0.75 in., or even larger. The wheels of the J20 R.P. hand pallet truck frequently used to become stuck at the ridges or in the gaps. This often caused considerable delay, requiring at times the unloading of the pallet.

In attempting to solve the difficulties involved in the operation of a hand pallet truck, certain general principles were borne in mind. The difficulties could be summarised under the follow-

ing headings: (a) design of the truck itself; (b) floor of the wagon; (c) load and its distribution.

The greatest problems in the design of the truck were in the design of the wheels and the resistance of the irregular wagon floor to the movement of the wheels. As this resistance varies in inverse proportion to the diameter of the wheels, one possible solution was to increase the size of the wheels. It was not considered practicable to increase the size of the rear wheels, which carry the bulk of the load, beyond a diameter of 3.54 in., but there was no difficulty in having driving wheels with a diameter of up to 9.84 in. To obtain the full benefit of an increase in the size of the driving wheels, it was found that more



Electric straddle-type lifting and stacking machine at the Nanterre general store of the S.N.C.F. The design of the base ensures stability

than 25 per cent. of the load would have to be borne by these wheels.

Experiments carried out in Sweden on the design of wagon floors were studied. The Swedish State Railways claimed that they had been able to maintain the floors of their wagons in a reasonably smooth condition only by using deal boards, and by taking great care to ensure an even surface when worn boards were replaced. Only thoroughly seasoned timber was used. Sweden is, however, an important timber-producing country and such a procedure would be more difficult to carry out in France.

In the United States many wagons have been constructed with nailable steel flooring; which is desirable in American conditions where fork-lift trucks weighing, when loaded, more than four tons, enter the wagon. French policy now tends more to the idea of reserving temporarily for palletised traffic wagons with evenly surfaced floors. It is hoped

ultimately to instruct workshops that when floorboards are being replaced regard should be paid to minimising differences in thickness of new and old boards. Such a policy would, however, retard the rate of repair and create difficulties with piece-work rates.

The Swedish State Railways expressed the view that palletised loads moved by a hand pallet truck should not exceed 600 to 800 kg. (approximately 12 to 16 cwt.). This was always recognised by the S.N.C.F. as a possible solution to its problem, but it must be remembered that, as far as its experiments with stores traffic are concerned, the substitution of a 12-cwt. pallet for a one-ton pallet would have the following results:—

(a) 40 per cent. increase in the stock of pallets;

(b) limitation of the load in a K-type covered wagon (with a normal capacity of approximately 15 tons) to eight tons;

(c) increase of stacking space at stores;

(d) 40 per cent. increase in number of lifts made by fork-lift trucks at stores.

The S.N.C.F. was reluctant therefore to adopt a compromise solution and has continued its efforts to develop a hand pallet truck of sufficient capacity to meet the needs of the Sotteville Store. A modified version of the J20 R.P. truck has recently been evolved; tandem wheels have been fitted at the rear instead of single wheels, reducing from 441 lb. to 220 lb. the tractive effort required to overcome a variation of 0.2 in. in thickness between two boards. Even now, there is still considerable difficulty in moving a loaded pallet truck on a rough wagon floor.

A strict rule which is enforced in the Sotteville Store is that the load on a pallet shall never exceed one ton, and it is usual to have two men to move a pallet into place in the wagon. In addition, the condition of wagons is observed when they are placed for loading with palletised traffic.

With the aid of this modified J20 R.P. hand pallet truck, 1,200 tons of palletised traffic are now despatched monthly from the Sotteville Store without undue difficulty.

Future Developments

The skill shown by the S.N.C.F. in adapting palletisation to meet the needs of its own stores traffic is to the credit of the officers of the Stores Department of the Western Region. Despite the initial setbacks, great progress has been achieved in mechanised handling, with greatly enhanced efficiency and reduced administrative costs. Up to now efforts have been confined largely to handling a limited section of stores traffic, but the promising results are not only likely to lead to a gradual extension of the palletisation principle to a much larger quantity of stores traffic, but are also likely to be of value to other services, particularly the Operating and Commercial Departments.

Safety Treads for Rolling Stock

Use of plastic moulded material providing resistance to wear and a non-slip surface

A RECENT development in plastic compounds is the Altro safety tread which provides a non-slip surface and resistance to wear. Treads of this material have been fitted to the timber step boards at the side entrance doorways of carriages recently built for the Ceylon Government Railway under the supervision of the Crown Agents for the Colonies by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. and the Gloucester Railway Carriage & Wagon Co. Ltd., which were described and illustrated in our March 28 issue, and also to road passenger transport vehicles of the London Transport Executive and other similar undertakings.

The treads are moulded under high pressure, and are composed of a special plastic compound. To provide a non-slip surface, Altro (aluminium oxide) grit is incorporated. The grit is extremely hard and abrasive, and combined with the properties of the plastic compound ensures a non-slip surface throughout its life, and is claimed to be proof against oil, acid, and water and unaffected by temperature.

Recent Developments

A further and more recent experiment with the non-slip materials is the production in roll form of Altro safety flooring. The material can be laid over large areas in continuous lengths, and is available in two thicknesses, $\frac{3}{8}$ in. and $\frac{1}{2}$ in., with hessian backing, and when laid does not creep or shrink.

The $\frac{3}{8}$ in. material has been used by the Pullman Car Co. Ltd. in some of its



Safety treads as fitted to the Ceylon Government Railway third class stock

"Golden Arrow" and "Brighton Belle" stock where it has been laid in vestibules and corridors of passenger cars and in kitchen cars.

Available in 50 yd. lengths by 3 ft. wide, the flooring can be laid with a suitable adhesive or tacked to wooden floors. Joins can be sealed with a jointing paste having similar properties to that of the material. The hard-wearing

qualities are claimed to be somewhat better than granolithic flooring when used in goods sheds which are subject to continuous wear by fork trucks and palletised traffic. The $\frac{3}{8}$ in. thick material is recommended for this purpose. The flooring is claimed to be unaffected by alkalis and organic solvents. Both the treads and the flooring are products of the Adamite Co. Ltd.

Oil-Fired Locomotives for Jordan Railways

(Concluded from page 688)

Ajax grease lubrication is provided for the coupled axleboxes, and connecting and coupling rods. Lambert wet sanding is arranged for the leading and trailing coupled wheels. Other special fittings include a Clyde patent sandgun for tube cleaning.

The tender is of the double bogie type, the tank being of semi-welded construction. The frames are composed of channels and sections reinforced with steel castings at front and rear. Capacities for 3,000 gal. of water and 1,650 gal. of fuel oil are provided. A special compartment, with steam heating coil, is located inside the main fuel tank, to which a Rototherm thermometer is fitted.

Vacuum brake equipment is fitted for tender and train use; the engine brake is steam operated. All the electrical equipment is provided by J. Stone & Co. (Deptford) Ltd.

The following are the leading dimensions of the locomotive:—

Cylinders (2)	17 in. dia. by 24 in. stroke
Wheels, coupled, dia. ...	4 ft.
" leading truck, dia. ...	2 ft. 4½ in.
" trailing " " " ...	2 ft. 4½ in.
" tender bogies " " ...	2 ft. 4½ in.
Wheelbase, coupled ...	13 ft. 5 in.
" engine	27 ft. 9 in.
" engine and tender ...	51 ft. 11 in.
Heating surface:—	
Tubes	1,248 sq. ft.
Firebox	133 sq. ft.
Total evaporative ...	1,381 sq. ft.
Superheater	310 sq. ft.
Total	1,691 sq. ft.
Grate area	26 sq. ft.
Boiler pressure	180 lb. per sq. in.
Weight of engine in working order	55 tons 12 cwt. 2 qrs.
Weight of tender in working order	39 tons 13 cwt. 1 qr.
Total	95 tons 5 cwt. 3 qrs.
Tender capacity, water ...	3,000 gal.
" oil	1,650 gal.
Tractive effort at 85 per cent. boiler pressure	22,110 lb.

RAILWAY PHOTOGRAPHIC EXHIBITION.—An exhibition of some 400 prints of sailing subjects in all parts of the world is being held at Grant Brothers Exhibition Hall, Croydon, and is accompanied by a display arranged by the Croydon Model Railway Club. The event has been organised on behalf of the National Playing Fields Association. It will continue until June 28.

BELGIAN CONGO 50-CYCLE ELECTRIFICATION.—It is reported that the Jadotville-Tenke section of the Elizabethville-Port Francqui line in the Belgian Congo is being electrified at 22,000 volts, 50 cycles. The section is 94 km. long, 3 ft. 6 in. gauge, and is worked by the Bas Congo-Katanga Railway.

IRON AND STEEL PRODUCTION IN MAY.—The output of steel ingots and castings in May was at an annual rate of 16,245,000 tons, compared with a rate of 15,866,000 tons in April and of 15,864,000 tons in May, 1951. Pig iron production was at an annual rate of 10,456,000 tons, against a rate of 10,472,000 tons in April and 9,482,000 tons in May last year.

CAMPAIGN FOR SAFER LUGGAGE TRANSPORT.—British Railways have begun a campaign advising passengers of the best means of labelling and securing their luggage. Special window displays have been made embodying posters listing "Points to Remember" and "Faults to Avoid." These displays will be offered to stores for use in their baggage departments and will also be exhibited in railway town office windows. Most of the hints concern the use of duplicate labels and firm fastenings. In addition to window displays, double royal posters will be exhibited at stations.

New Car Ferry for Dover-Boulogne Service

British Railways ss. "Lord Warden" has accommodation for 120 cars and 1,000 passengers



ON June 17 ss. *Lord Warden*, built by William Denny & Bros. Ltd. for British Railways, and launched by Mrs. John Elliot, wife of the Chairman of the Railway Executive, entered service on the Dover-Boulogne route. The ship has been specially designed for the carriage of cars between Britain and France by the short sea routes. Based at Dover, it will augment the Southern Region service, previously performed by ss. *Autocarrier* and ss. *Dinard*, having a carrying capacity of 120 cars, as against the 24 and 70 of the other two ships.

A feature of the new vessel is the arrangement for the loading of road vehicles. Folding steel doors are fitted at the stern and these when opened allow cars to be driven directly on board at all states of the tide, over loading ramps, which will be provided at the new terminals at Dover, Boulogne and, eventually, at Calais. The ramp at Boulogne is in service and that at Dover, which is to be built by the Dover Harbour Board, is expected to be ready by 1953.

A turntable is provided at the forward end of the car deck, so that cars embarking can be driven along one side of

the ship, turn, and return along the other side, and be facing aft, ready to drive off again, when disembarking. The clear deck height of 10 ft. 6 in. over the major portion of the car space, will enable motorcoaches to be carried, and at the aft end, the promenade deck has been left open, allowing unlimited clearance so that a number of double-deck buses can be carried.

Powerful fans have been fitted to ensure that fumes from vehicles being driven on and off are rapidly dispersed. Fireproof curtains have been fitted dividing the car space into four separate compartments and an automatic sprinkler and fire alarm system protects passenger accommodation and the garage. Steel bars are welded to the deck and coloured white for the guidance of motorists when driving aboard.

The design of the vessel is on modern lines, with little to distinguish it from the modern passenger vessels on the short sea routes. It has a large streamlined funnel, two tripod masts, a raked stem and cruiser stern, and will have accommodation for 1,000 passengers and 77 crew.

A bow rudder has been provided for use when steaming astern into the chan-

nel ports, and into the loading bays at the new terminals. Propulsion is by twin screws and each main propelling unit, consists of one all impulse type turbine, with double reduction gearing. The turbines and gearing are of the latest design of the Parsons & Marine Engineering Turbine Research & Development Association, developing a total of 8,000 s.h.p. to give the vessel a service speed of 20 knots when fully loaded. High power for astern working is provided and the vessel has an astern speed of 16 knots.

Passenger Accommodation

On the boat deck, a well-appointed smoke room, with bar, is arranged at the forward end. The smoke room, which will seat 75, is panelled in Pacific maple, with a zebbrano surbase, light mahogany skirtings and solids, with burr maple relief to columns. The settees and chairs are upholstered in grey-blue and wine-coloured vaumol hide. Special attention has been given to electric lighting.

A spacious lounge-buffet has been arranged forward on the promenade deck; it is in two sections, with port and starboard corridors leading into the lounge proper. The serving buffet is arranged at the aft of the main lounge and opposite this is featured an illuminated jardiniere. Aft of the lounge are grouped the passport offices, ticket office and bank.

Eight private cabins, each with private lavatory fitted, are arranged port and starboard amidships on this deck. A ladies' rest room is provided amidships. Settee berths with Dunlopillo cushions are fitted, so arranged that the backs can be hinged up to provide additional upper berths if necessary.

Immediately abaft of amidships is situated the restaurant, extending the full width of the vessel, and fitted with large windows providing an excellent view. It is arranged to seat 140 at tables for two, four, or six.



Car storage deck, showing turntable



Smokeroom

RAILWAY NEWS SECTION

PERSONAL

Mr. C. H. D'Souza has retired as Deputy Chief Mechanical Engineer (Carriage & Wagon), Central Railway, India.

Mr. C. F. Rose, B.Sc.(Eng.), A.M.I.Mech.E., A.M.I.Loco.E., Assistant Locomotive Works Manager, Doncaster, Eastern Region, who, as recorded in our May 23 issue, has been appointed Locomotive Works Manager (Acting), Doncaster, was educated at the Grammar School, Streatham, and entered the L.N.E.R. Stratford Locomotive Works in 1926 as a premium apprentice. In 1929 he was awarded an L.N.E.R. Directors' Scholarship enabling him to attend Queen

Mr. R. H. Wall has been appointed to the Colonial Engineering Service as Senior Assistant Engineer (Railways) in Sierra Leone.

We regret to record the death on June 11, of Mr. A. E. Cannon, M.Inst. T., a Director of Wilts & Dorset Motor Services Limited, Southdown Motor Services Limited, and London Coastal Coaches Limited.

Mr. G. Ford, District Motive Power Superintendent, Southend (Plaistow), Eastern Region, who, as recorded in our May 30 issue, has been appointed District Motive Power Superintendent, Sheffield, joined the L.N.E.R. as a premium appren-

The late Sir Alan Garrett Anderson, G.B.E., who was Controller of Railways, Ministry of War Transport, and Chairman of the Railway Executive Committee, 1941-45, left "so far as can at present be ascertained" (duty paid £126,124), £169,017.

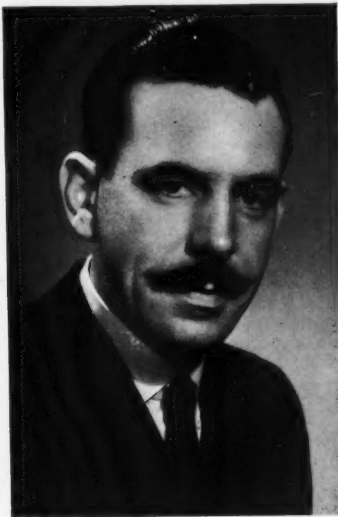
We regret to record the death on June 12 of Sir Harry Lawson, K.C.M.G., who was appointed to the board of the Mount Lyell Mining & Railway Co. Ltd. in 1937.

Mr. R. R. M. Barr, Assistant Marine Superintendent, Parkeston Quay, Eastern Region, who, as recorded in our April 18 issue, has been appointed District Marine Manager, Dover, Southern Region, joined



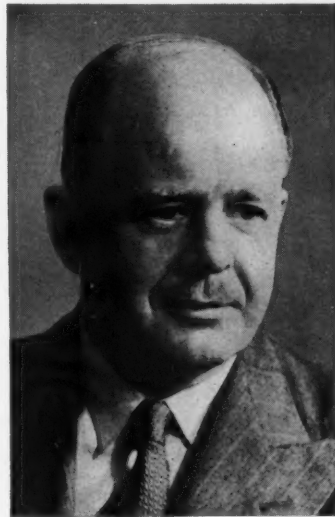
Mr. C. F. Rose

Appointed Locomotive Works Manager (Acting), Doncaster, Eastern Region



Mr. G. Ford

Appointed District Motive Power Superintendent, Sheffield, Eastern Region



Mr. R. R. M. Barr

Appointed District Marine Manager, Dover, Southern Region

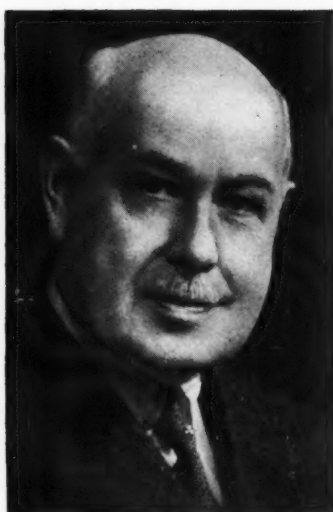
Mary College (University of London) for three years. After experience in the Locomotive Drawing Office and Motive Power Department in the Stratford District, he was in 1937 transferred back to the C.M.E. Department as Technical Assistant at Shildon Wagon Works, where he was ultimately promoted to the rank of Assistant Works Manager. In 1946 he was appointed Assistant Locomotive Works Manager, Doncaster.

Mr. W. R. Watson, Assistant to Commercial Superintendent, Traffic & Routes (Goods), Eastern Region, has retired.

Mr. W. H. Preston, District Traffic Manager, Invercargill, New Zealand Government Railways, who, as recorded in our May 30 issue, is retiring, joined the railways in 1912 as a clerical cadet at Christchurch, and later served two and a half years with the New Zealand Expeditionary Force. In 1936, after 17 years' experience in the Invercargill area, he was transferred to Greymouth as Train Running Officer. Mr. Preston remained on the West Coast until 1947, when he was promoted to Transport Officer at the District Traffic Manager's Office at Invercargill. A few months later he was appointed as District Traffic Manager.

tice at Doncaster Locomotive Works in 1929 and after training, was appointed Supernumerary Running Shed Foreman at Neasden in January, 1934. A similar appointment at Norwich followed, where Mr. Ford remained until January, 1937, when he became Locomotive Shedmaster, Yarmouth Beach. In November of the same year, he was transferred to Bury St. Edmunds as Locomotive Shedmaster, took up the corresponding positions at Southend in 1940 and at Stockport in 1943. In January, 1944, Mr. Ford was appointed Chief Running Shed Foreman, supervising the Train Working Section, at Stratford Motive Power Depot, followed by transfer, in September of the same year, to the position of Supernumerary Trains Assistant (Joint) to the District Superintendent and District Motive Power Superintendent, Cambridge. He was transferred to the District Motive Power Superintendent's Office, Cambridge, as Chief Clerk in 1946 and returned to the Stratford District in 1947 as Assistant District Motive Power Superintendent; in February, 1949, he moved to Gorton as Acting District Motive Power Superintendent. He continued in this position until June, 1949, when he took charge of the Southend District (Plaistow), on the transfer of the former London, Tilbury & Southend Line to the Eastern Region.

the former L.N.E.R. in 1923, as a traffic apprentice and, on completion of his training, held several appointments in the Traffic Departments at York, Newcastle and Hull. He became Staiths Superintendent & Yardmaster at Blyth in 1937. As an Officer in the Royal Engineers (Transportation) Supplementary Reserve, he was mobilised at the outbreak of war and served in France during 1939-40 as Docks Superintendent, Le Havre & Northern French Ports. Between 1940-43 he served in the Middle East as Docks Superintendent, Canal Area & Alexandria; and also as D.A.Q.M.G. (Mov. & Tn.) at Benghazi and Port Said. In August, 1943, he was appointed A.D. (Tn.) Directorate, 21 Army Group, with the rank of Lt.-Colonel and was responsible to the Director of Docks for the planning and operation of the ports in connection with the Normandy landings. He took part in the invasion of Europe and remained with 21 Army Group until he was demobilised in August, 1945. Mr. Barr resumed duty with the L.N.E.R. in September of the same year as Docks Superintendent, Western Docks, Hull, where he remained until his appointment as Assistant Port Master, Grimsby and Immingham, in 1947. In 1950 he became Assistant Marine Superintendent, Parkeston Quay, Eastern Region.



Mr. J. T. Drinkwater

Assistant (Revenue Matters) to the Chief Financial Officer, Railway Executive, 1948-52

Mr. J. T. Drinkwater, Assistant (Revenue Matters) to the Chief Financial Officer, Railway Executive, who, as recorded in our June 13 issue, has retired, joined the Goods Audit Office of the Great Central Railway in 1902 and became Personal Clerk to the Audit Accountant in 1906. He served in the Royal Artillery in France, Belgium and Germany from August, 1916, to October, 1919. In 1924 he was transferred to the L.N.E.R. Chief Accountant's Office in London, becoming Personal Assistant to the Chief Accountant in 1927 and Revenue Assistant in 1936. He combined this office with that of City Manager's Accountant in 1943 and was appointed Revenue Accountant (Coaching) in 1947. He became Assistant (Revenue Matters) to the Chief Financial Officer, Railway Executive, in March, 1948.

Mr. H. T. Forth, Assistant Chief Accountant, Western Region, British Railways, has retired.

Mr. James C. Jones, General Manager of the Paraguay Central Railway, is visiting England on leave of absence.

We regret to record the death in Buenos Aires of Mr. Eric Mackern Gibson, Assistant Signal Engineer, General Roca Railway, Argentina.

Mr. Stanley H. Spry, Assistant Chief of the Investigation Department, Canadian Pacific Railway, has retired. He is succeeded by Mr. Jean E. Belanger, formerly Chief Inspector of the Quebec District.

Mr. F. W. Crews, Secretary of the Institute of Transport since 1941, completed earlier in the year 25 years' service on the staff of the Institute. To commemorate this the Council of the Institute has presented him with a gold wrist watch.

We regret to record the death on June 10, at the age of 87, of Sir Samuel Osborn, J.P., LL.D., President of Samuel Osborn & Co. Ltd. He was the second son of the Founder and entered the business in 1882, becoming a Partner in 1889, a Director in 1905, Chairman in 1936 and President in 1948.



Mr. Colin Morrison

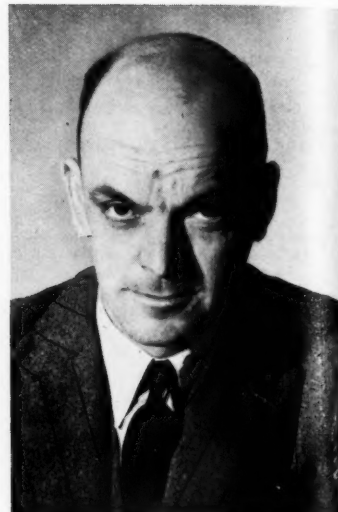
Assistant to Commercial Superintendent (Goods), Scottish Region, 1949-52

Mr. Colin Morrison, Assistant to Commercial Superintendent (Goods), Scottish Region, who, as recorded in our May 2 issue, has retired, joined the Caledonian Railway in 1907, and in 1916 entered the Headquarters Offices (Rolling Stock Department) at Glasgow. Subsequently he held appointments in the L.M.S.R. Divisional Control Office (1926) and in the District Goods & Passenger Manager's Office, Aberdeen (1928), before being appointed District Traffic Agent, Forfar (1933). In 1936 he was appointed to the Commercial Manager's Office, Glasgow, and later that year became Goods Agent, Kinning Park. In the following year he returned to Aberdeen as Chief Clerk to the District Goods & Passenger Manager; in 1939 he was transferred to a similar position at Inverness and in 1942 was appointed Assistant District Goods & Passenger Manager, Inverness. He became District Controller, St. Rollox, in 1945; Assistant to Commercial Manager (Passenger), L.M.S.R., Glasgow, in 1946; and Assistant to Commercial Superintendent (Goods), Scottish Region, in 1949.

Mr. V. G. Cook has been appointed Manager of the London & South Eastern Area of the Small-Tools Division of Burton, Griffiths & Co. Ltd.

Mr. Walter J. Plogsted, Export Vice-President of the General Railway Signal Company, U.S.A., has retired, but is being retained by the company as export consultant. Mr. John W. Porter, Export Manager, has been appointed Director of Foreign Sales, and will succeed Mr. Plogsted.

The Minister of Transport has appointed Mr. W. J. Everard, who is a representative of shipping, to be a member of the Transport Users' Consultative Committee for the London Area, in place of Mr. F. Whittock, who has resigned. Mr. Everard is Managing Director of F. T. Everard & Sons Ltd. He is a member of the Coastal Shipping Advisory Committee and of the Coasting Tramp Section of the Chamber of Shipping. During the last war Mr. Everard served in an advisory capacity in the Ministry of War Transport.



Mr. Bernard Winterbottom

Appointed National Chairman, Road Haulage Association, for 1952-53

Mr. Bernard Winterbottom, who, as recorded in our May 23 issue, has been appointed National Chairman of the Road Haulage Association for 1952-53, is Managing Director of J. Campbell (Darwen) Limited and a Director of Winterbottom & Marshall Limited of Stalybridge and Mossley. He was Managing Director of J. & H. Whittakers (Transport) Limited of Oswaldtwistle until 1949, when this long-distance haulage concern was acquired by the British Transport Commission. Before and during the recent war he acted as Honorary Secretary for the East Lancashire Area of Associated Road Operators, one of the organisations which subsequently merged to become the R.H.A. Offices he has held include the Chairmanship of the North Western (Eastern) Area of the R.H.A. He has been a National Vice-Chairman of the Association for the past four years and Chairman of its National Finance Committee since 1949. Since the passing of the Transport Act he has acted as Chairman of the Association's Long Distance Panel of compulsorily acquired undertakings. Early in the war he prepared and presented to the Chief Inspector of Taxes, the case which resulted in the increased wear and tear allowances for "A" and "B" licensed vehicles. As livestock transport officer in the north-west. Mr. Winterbottom was, with a small committee of operators, responsible for the National Livestock Rates Schedule based on unit values, which was accepted by the Ministry of Food, and is still in use for livestock transported from collecting centres.

Mr. A. Paxton, Goods Agent, Stobcross (Glasgow), Scottish Region, who, as recorded in our May 16 issue, has been appointed Stationmaster, Glasgow Queen Street, began his railway career with the North British Railway at Haddington, and after serving at stations in the Edinburgh district and the Borders, was appointed Stationmaster, Kinneil, in 1919. Subsequently, he held appointments as Stationmaster, St. Monance (1920); Assistant Stationmaster, Perth General (1930); Stationmaster, Dundee East (1937); and Stationmaster, Cowlares (1940). He became Goods Agent, Stobcross, in 1947.

British Transport Commission Results for 1951

First revenue surplus since nationalisation: improved performance on British Railways: loss on London Transport buses due to increased costs

The Government decided that the *Statement of Accounts & Statistics* of the British Transport Commission for the fourth year of nationalised transport, to December 31, 1951, should be issued as a separate publication. The *Statement* therefore has been published some three weeks before the *Annual Report*, hitherto issued with the accounts in a single volume.

The whole of the Commission's undertaking earned a revenue surplus of £2.9 million during the year. This is the first surplus since the Commission started operations, and, with the exception of London Transport, all the major activities contributed to this improvement. Of this surplus, £2.7 million was required for capital redemption and £100,000 for special items, leaving a credit balance of £100,000, which compares with a deficit of £14.1 million for 1950.

Accumulated Deficit

The accumulated deficit on net revenue account at December 31, 1951, was thus reduced to £39.5 million. There was a working surplus for the four years 1948-51 of £165.6 million. The total central charges for the same period were £205.1 million, but these include capital redemption and other items "below the line" amounting to £13.6 million. After eliminating this last amount, the deficit is £25.9 million. This compares with balance sheet assets totalling over £1,700 million, or with gross revenue during 1948-51 of £2,200 million. The deficit of £25.9 million is less

than the surplus profit from railway operation accruing to the Exchequer in any single year of the later war period.

Net Revenue Account

The consolidated net receipts were as follows:—

	1951 £ million	Better (+) or worse (—) than 1950 £ million
Principal Carrying Activities		
British Railways (including C. & D. services) ...	31.7	+ 8.1
British Road Services ...	3.2	+ 4.4
Provincial & Scottish buses ...	3.9	+ 0.5
London Transport—Road ...	2.1	— 3.2
Rail ...	0.5	— 0.0
Ships ...	2.9	no change
Inland waterways (carrying) ...	0.1	no change
	£40.0m.	+£9.7m.
Other Principal Activities, including docks and hotels	3.8	+ 1.2
Miscellaneous activities ...	4.3	— 0.4
Interest and miscellaneous receipts ...	1.0	— 1.4
	49.1	+ 9.1
Deduct: interest, administration, and other central charges ...	46.2	3.7 (decr.)
Surplus of revenue receipts over expenditure for 1951 ...	2.9	12.8
Less: capital redemption and special items ...	2.8	1.4 (decr.)
Surplus ...	£0.1m.	+£14.2m.

Equilibrium was achieved in 1951 despite constantly rising levels of wages and prices.

During 1951, the annual rate of expenditure suffered identifiable increases of about £70 million, the most important being in wages, coal, oil fuel and duty, steel, and other materials. On the other hand, there were increases in charges made to the public, but equilibrium was not achieved simply by passing on to the public the rise in costs. The rise in transport charges since pre-war is much less than the rise in cost levels, as shown in the diagram on page 694.

Closing the Gap

The gap between the rise in costs and the rise in charges made to the public has been closed in various ways. First, the Commission points out, there is a smaller real remuneration of capital compared with prewar. Secondly, there have been useful increases in traffics (net traffic receipts improved by £9.7 million in 1951 over 1950). Thirdly there has been a better distribution of public obligation, e.g. unremunerative but essential local services, between the several forms of transport. Fourthly, the amounts reserved for replacement are based mainly on historical cost and not on current cost. Above all it is claimed by the B.T.C. that the gap has been closed as the result of important increases in efficiency and economy.

British Railways Increased Efficiency

On the railways, there was a consistent improvement in the use of equipment and staff. Efficiency in freight working is

BRITISH TRANSPORT COMMISSION: CONSOLIDATED BALANCE SHEET AT DECEMBER 31, 1951

December 31, 1950 £	£	£	December 31, 1950 £	£	£
Current Liabilities			Current Assets		
Creditors and accrued expenses (including £3,125,000 due to a Subsidiary Company) ...	64,245,765		Bank balances, Treasury Bills, deposits at short call and cash ...	84,013,122	
Consideration for undertakings acquired payable in cash (estimated) ...	6,313,713		Marketable securities (market value £8,423,682) ...	8,467,041	
Interest (less income tax) accrued on capital liabilities ...	11,036,239		Outstanding traffic accounts ...	59,234,141	
Taxation ...	18,475,173		Other debtors and payments in advance ...	12,445,910	
	89,679,498		Stores and materials ...	87,127,159	
		100,070,890			251,287,373
Deposits			Investments in respect of British Transport Stock Redemption Fund Accounts (market value £10,627,932)		10,661,287
By staff savings banks ...	41,100,333				
By staff superannuation funds ...	79,179,311				
	120,279,644				
Provisions			Fixed Assets and Goodwill on bases indicated in support statements		
For abnormal maintenance ...	89,513,167		Interests in non-controlled undertakings ...	10,005,151	
For pre-vesting actuarial deficiencies of guaranteed superannuation funds ...	106,943,723		Interests in subsidiary companies not engaged in the principal activities of the Commission ...	2,263,004	
Other provisions ...	21,750,551		Rolling Stock, vehicles, ships and plant and equipment ...	797,198,002	
	218,207,441		Deduct depreciation accrued to date ...	415,372,990	
	438,557,975			381,825,012	
Capital Liabilities			Land, buildings, permanent way, docks, canals, and other works (Renewals of these assets are dealt with as revenue charges) ...	988,596,325	
Loan from London Electric Transport Finance Corporation Limited (repayable 1950/55) ...	40,160,040		Goodwill ...	64,244,443	
Loan from Railway Finance Corporation Limited (repaid July 31, 1951) ...	27,000,000				
Obligations to local authorities in respect of the redemption of loans ...	928,155				
Consideration for undertakings acquired to be satisfied by the issue of British Transport Stock (estimated) ...	14,362,753				
British Transport Stock ...	1,245,114,366				
	1,300,565,314		Discounts less premiums on issue of British Transport Stock, less amounts written off ...		1,515,355
	1,078,676		Net Revenue Account — balance (deficit) at December 31, 1951 ...		39,463,811
Capital Redemption Accounts ...	10,738,472				1,749,861,761
	1,749,861,761				

Note.—Estimated further expenditure on Capital Account authorised at December 31, 1951: £149,000,000.

HURCOMB, Chairman
J. BENSTEAD, Deputy Chairman
REGINALD WILSON, Comptroller

CONSOLIDATED WORKING RESULTS OF PRINCIPAL ACTIVITIES OTHER THAN CARRYING

	Docks, harbours, and wharves	Inland waterways : other than carrying operations	Hotels and catering			Commercial advertising	Letting of sites, shops, etc., on premises and properties in use for transport purposes	Grand total
			Hotels	Refreshment rooms	Restaurant cars			
Gross receipts	£ 14,867,486	£ 1,761,035	£ 6,046,202	£ 7,213,217	£ 3,094,462	£ 2,967,992	£ 1,513,339	£ 37,463,733
Working expenses (including depreciation or renewals but after deducting abnormal maintenance)	14,050,245	1,947,487	6,011,650	6,884,203	3,730,942	844,616	200,217	33,669,360
Net receipts	817,241	186,452 (deficit)	34,552	329,014	636,480 (deficit)	2,123,376	1,313,122	3,794,373
Year 1950								
Gross receipts	12,497,706	1,589,834	5,532,542	6,373,350	2,865,044	2,870,906	1,450,598	33,179,980
Working expenses	12,552,553	1,743,963	5,723,284	6,150,862	3,509,486	767,982	185,817	30,633,947
Net receipts	54,847 (deficit)	154,129 (deficit)	190,742 (deficit)	222,488	644,442 (deficit)	2,102,924	1,264,781	2,546,033

shown by the Commission to have improved in the light of net ton-miles per total freight engine-hour, which increased from 461 in 1938, to 543 in 1948, and rose to 595 in 1951.

This is claimed as the highest level of efficiency yet produced for freight operation in the operating conditions peculiar to Great Britain, with an improvement since prewar of some 30 per cent., achieved despite inadequate capital re-equipment. The steady progress during the last four years, the Commission states, is due largely to measures taken to unify operations on a national basis, to eliminate uneconomic routing dictated by the old territorial interests, and to remove other barriers to efficiency which formerly existed.

There has been since 1948 a continuing reduction of staff on British Railways, which after allowing for unfilled vacancies has resulted in substantial economy.

Improved Performance

Despite reductions in staff and in the capital apparatus employed, there was a rise in both passenger-miles and freight

ton-miles in 1951, and the total traffic carried in 1951 exceeded any peacetime year since the present statistics were first compiled in the 1920's.

Another factor making for greater economy was the assistance offered by British Road Services in coping with uneven traffic flows, and thus accepting a greater measure of the public obligation.

Lower Average Fare Paid

There was an actual decline in the average fare paid by railway passengers as a whole since January 1, 1948, the receipts per passenger mile being 1.38d. in 1948, 1.3d. in 1949, 1.26d. in 1950, and 1.24d. in 1951.

80,212, of which only some 400 were employed at Executive Headquarters. The present ratio of staff employed per ton carried or per vehicle operated, and also the ratio of clerical to other staff, are stated to be more favourable than in 1948.

Although the organisation was absorbing almost 1,000 undertakings during the earlier part of 1951, until the present Government took office in the autumn, the proportion of totally empty running diminished, the average load per vehicle increased, and the number of complaints declined.

Provincial and Scottish Buses

Working expenses rose sharply, the increase in oil duties alone being some £2.6 million in a full year. Nevertheless, the year resulted in a working surplus of £3.9 million. The total staff per vehicle licensed throughout the year showed a reduction. Long-distance express coach services continued to be highly profitable, despite low fares. Load factors of over 90 per cent. were achieved. The profits so earned were used to assist the stage carriage services.

London Transport

At the beginning of 1951 it became clear that because of rising costs and other factors it would again be necessary to increase fares on London Transport services unless they were to be subsidised by the Commission's other services, passenger or freight. The case was presented to the Transport Tribunal in the Passenger Charges Scheme in April 1951, but the decision of the Tribunal was not given until early in 1952.

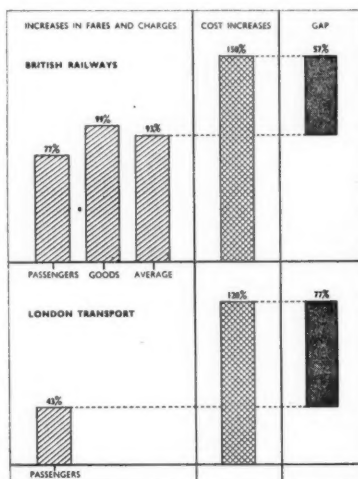
Consequently, the Commission points out, London Transport worked for the whole of 1951 at fare levels appropriate to a much earlier cost situation, before successive increases in fuel duty and wages took place, and before the decline in traffic from abnormal postwar levels had been fully felt. In the result, not only was there no contribution towards central finances but there was a working deficit of £1.6 million.

For the first time in the history of London Transport, rail showed better results than road. This change was caused partly by the extra fuel duty borne by the road services, but was due in the main to the buses assuming a larger share of the burden of public obligation. Whereas, previously, workmen's and season-ticket traffic were carried almost wholly by the railways and the trams (or their equivalent), from October 1950, onwards the concession of an early-morning fare equivalent to a workman's ticket was given for the first time on London Transport buses.

Apart from increases in wage, price, and

BRITISH RAILWAYS WORKING RESULTS, YEAR 1951

Year 1950	£	£
Gross receipts :		
Passenger train—		
Passengers		
89,020,811	Ordinary	89,634,381
6,185,272	Early morning tickets and workmen	6,197,468
11,405,406	Season	11,190,658
106,611,489		107,022,507
23,048,291	Parcels and other merchandise	24,749,135
7,634,470	Mails and parcels post	8,302,392
137,294,250		140,074,034
Freight train—		
86,729,808	Merchandise	98,220,699
32,496,552	Minerals (Classes 1 to 6)	36,761,250
77,821,545	Coal and coke	91,319,800
1,868,918	Livestock	1,556,081
198,916,823		227,857,830
3,859,225	Miscellaneous	4,791,098
340,070,298	Total	372,722,962
Working expenses (including depreciation or renewals but after deducting abnormal maintenance)—		
112,600,037	Train and vehicle operating costs	121,072,847
65,781,133	Maintenance and depreciation of rolling stock	68,710,729
75,945,370	Other traffic costs	83,846,688
49,936,906	Maintenance and renewal of way and structures	53,129,408
9,476,767	General expenses	11,010,149
313,740,213	Total	337,769,821
26,330,085	Net traffic receipts	34,953,141



Comparison between rises in charges and costs on main-line railways and London Transport since prewar

This was accounted for by the increased use of workmen's, season, and cheap-day tickets at rates well below the standard fare per mile.

Road Haulage

British Road Services earned a working surplus in 1951 of £3.2 million, compared with a deficit of £1.2 million in 1950, after charging considerable expenditures on vehicles kept in reserve to meet winter traffic difficulties. The improvement on the previous year is stated to be due in the main to the fact that the organisation successfully completed during 1951 the first stage of its development.

The total staff in December 1951 was

tax levels, London Transport road services suffer specially from the congestion which prevents an increase in the speed of traffic or even slows it down.

Ships and Other Activities

There was again a satisfactory return from the shipping services, amounting as for the previous year to £2.9 million. Contributions from individual services were very uneven; shipping services in Scotland, for example, continued to show an absolute deficit on net traffic receipts.

The working results of other principal activities showed a gain of £1.2 million on 1950. The steady improvement in dock results is regarded by the B.T.C. as especially noteworthy. The change in the hotel results is stated to be encouraging, but no allusion is made in the accounts to rising costs necessitating the recent rise in restaurant car prices.

Mont Blanc Road Tunnel

The French Government has earmarked fr.2,000,000,000 (approximately £2,045,000) drawn from the Fonds des Investissements Routiers (Road Investment Fund) as a first contribution towards the building of the Mont Blanc road tunnel. The final agreement on the tunnel has yet to be signed, and will have to be ratified by the French and Italian Parliaments. Only then could building begin. The tunnel is therefore not likely to be opened in 1956 as originally thought.

Opposition to the scheme is growing in Savoy because of local preference for a rival scheme for a road tunnel under the Mont Fréjus, under which the Mont Cenis railway tunnel passes. Mont Fréjus is some 50 miles south of Mont Blanc. Savoy interests stress that the road connection between Paris and Rome via Dijon, Bourg, Belley, Modane and Turin would be more convenient than that via Chamonix and the Mont Blanc tunnel with its eastern end in the Aosta Valley. The main objection to the Savoy scheme is that the Mont Fréjus route would not be able to attract traffic as it would be almost paralleled by the Modane-Turin railway. This would eventually lead to the construction of the Great St. Bernard tunnel as a competitive scheme.

The Swiss Government has declared that Switzerland has no particular interest in the Mont Blanc scheme and that no support will be given to Swiss interests favouring it. The Swiss Federal Council consider that the Mont Blanc road tunnel, some 39,500 ft. long and costing an estimated \$70,000,000, would be uneconomic despite the high road toll proposed. The same would be true, it believes, of the Great St. Bernard tunnel proposed by Swiss rival interests.

CLOSING OF BULFORD BRANCH, SOUTHERN REGION.—Pursuing the policy of closing branch lines which have proved uneconomical to operate, providing adequate alternative services are available, the Southern Region will withdraw the passenger train service from the Bulford Branch on and from June 30 next. Newton Tony, Amesbury, and Bulford stations will be closed to passengers. Alternative facilities are provided by the omnibus services of the Wilts & Dorset Omnibus Company from Salisbury and Andover. Arrangements for the collection and delivery of parcels and freight train traffic will continue to operate throughout the area served by the branch, and the stations at Amesbury and Bulford will remain open for such traffic.

CONSOLIDATED WORKING RESULTS OF PRINCIPAL CARRYING ACTIVITIES

	Railway passenger and freight services of British Railways		Collection and delivery of other road services of British Railways		Road haulage by British Road Services		Road passenger services of provincial and Scottish groups		London Transport services		Ships: passenger and cargo services of British Railways		Inland Waterways carrying operations		Grand total	
	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.
Gross receipts:																
Passengers	107,022,507	36	9,326,589	53	38,777,079	51	24,459,159	61	26,551,143	58	4,033,344	42	263,699	29	229,953,033	42
Freight, parcels, and mails	260,509,357	20	1,133,538	24	18,613,407	25	8,658,024	22	8,331,543	20	1,770,379	18	168,437	19	113,766,101	21
Miscellaneous	4,791,098	25	1,221,105	7	5,481,517	7	3,533,722	9	5,425,896	12	3,243,258	33	4,990	1	106,260,471	20
Total	372,322,962		10,563,030		78,577,240		43,890,591		43,387,768		12,572,846		806,934		579,053,353	
Percentage of grand total—Year 1951	64		2		14		8		7		2		—		100	
Percentage of grand total—Year 1950	66		2		12		7		8		2		—		100	
Working expenses (including depreciation or renewals, but after deducting abnormal maintenance):																
(a) Running and maintenance of rolling stock and ships	121,072,947	36	9,326,589	53	38,777,079	51	24,459,159	61	26,551,143	58	4,033,344	42	263,699	29	229,953,033	42
(b) Maintenance and depreciation of buildings and structures	68,710,729	20	1,133,538	24	18,613,407	25	8,658,024	22	8,331,543	20	1,770,379	18	168,437	19	113,766,101	21
(c) Other traffic costs	83,846,688	25	1,221,105	7	5,481,517	7	3,533,722	9	5,425,896	12	3,243,258	33	4,990	1	106,260,471	20
(d) Maintenance and renewal of way and structures	53,129,408	16	65,392	—	467,380	1	672,096	2	1,374,300	3	11,975	—	—	—	58,831,898	11
(e) Vehicle licence duties and inland waterway tolls	—	—	485,074	3	1,929,982	3	945,417	2	845,786	2	11,975	—	165,030	18	4,371,289	1
(f) General expenses	11,010,149	3	2,317,485	13	10,061,336	13	1,776,300	4	2,354,945	5	686,957	7	293,058	33	29,564,411	5
Deduct:																
(g) Carriage charged to other activities	—	—	17,549,183	100	—	—	—	—	—	—	—	—	—	—	542,747,203	100
Total	337,769,821	100	3,675,667		75,330,651	100	40,044,718	100	45,485,613	100	9,695,813	100	895,214	100	539,071,536	
Net traffic receipts	34,953,141		3,310,486		3,246,589		3,853,873		2,095,890		2,877,033		88,280		39,981,817	
Operating ratio: percentage of working expenses to gross receipts	91		131		96		91		105		77		111		93	
Year 1950																
Gross receipts	340,070,298		9,560,472		62,473,177		38,673,331		41,318,089		11,412,052		693,638		519,233,651	
Working expenses	313,740,213		12,335,886		63,579,653		35,283,646		40,228,929		8,562,042		787,433		488,890,985	
Net traffic receipts	26,330,085		2,775,414		1,106,476		3,389,685		1,089,160		2,850,010		(deficit)		30,342,666	
Operating ratio: percentage of working expenses to gross receipts	92		129		102		91		97		75		114		94	

NOTE.—The classification of working expenses under the six main heads shown above, while broadly uniform, differs to some extent for the various principal activities shown

Parliamentary Notes

Passenger Fares

Mr. Alan Lennox-Boyd (Minister of Transport) made the following statement in the House of Commons on June 16 about the British Transport Commission's fares:—

"On April 28, the House approved a motion upholding the decision that disproportionate increases should not be applied to certain passenger charges outside the London area and agreeing that means should be sought of applying the same principle so far as practicable to rail and omnibus fares already introduced within the London Area.

"Discussions have taken place with the B.T.C. and I am now able to announce that the following modifications will be made in the increased passenger charges which were brought into force in the London Area on March 2, and those which it was proposed to bring into force outside that area on May 1.

"Each sub-standard charge will be increased only by the same amount as a standard charge of the same value, in the following cases: ordinary and early morning fares and season ticket rates on London Transport; and workmen's and early morning fares, and season ticket rates (other than those for traders' season tickets) on British Railways.

"This will involve the restoration of the stages in operation prior to March 2 on London Transport road services. In those cases where workmen's tickets are now available up to 8.30 a.m. or later, early morning tickets will be available up to 8.30 a.m. The issue of shift workers' tickets will be resumed in the London Area on the basis in force immediately prior to March 2, and continued outside that area on the existing basis.

"Under the Commission's Passenger Charges Scheme in relation to British Railways, ordinary fares on the basis of 1-75d. per mile have replaced ordinary fares on the basis of 2-44d. a mile and monthly return fares on the basis of 1-79d. a mile. In spite of this, there are still a number of sub-standard ordinary fares on British Railways. These will be increased by only 20 per cent. in the circumstances in which the Passenger Charges Scheme provides for a limitation of 42 per cent.

"Concession fares which were on a general basis of $\frac{1}{3}$ ordinary fare will be continued on a general basis of $\frac{1}{3}$ of the new and reduced ordinary fare. Those which were on a general basis of $\frac{2}{3}$ ordinary fare will be replaced by the reduced ordinary fare. In both cases, the increase in the general basis will be less than 10 per cent. The discount on bulk travel fares will cease. Fares for members of the Forces and Mercantile Marine and their wives and children are the subject of separate consideration.

"The resultant loss of revenue through all these changes is estimated to be about £1,240,000 in the London Area and £660,000 outside that area, a total of £1,900,000 in a full year.

"It is hoped to bring the modified charges into force in the London Area on August 31 and outside that area on the following day. The work involved will be very considerable and I am sure the House will be grateful to the Commission and its staff for their efforts in making these dates possible."

Dieselisation of Branch Lines

Lord Sempill, speaking in a House of Lords debate on science and industry on June 12, advocated, in the interest of trade

and industry, acceleration of railway freight services with increased punctuality and numbers of trains, through fitting of continuous brakes to all goods vehicles.

Passenger branch-line services, added Lord Sempill, should be dieselised. Experience in some 70 countries, including Northern Ireland and the Irish Republic, had shown diesel railcars to be 20-60 per cent. more economical. Recently, on April 4, in the House of Commons the Parliamentary Secretary to the Ministry of Transport, Mr. Gurney Braithwaite, had said: "Railcars had long been studied and there was nothing that was not known about their design." Obviously, said Lord Sempill, that was not the statement of an engineer—"By their fruits shall ye know them."

Duty on Railway Sleepers

Brigadier H. R. Mackeson (Secretary for Overseas Trade) in the House of Commons on June 11 moved that the Import Duties (General *Ad Valorem* Duty Reduction) Order, 1952, be approved. This order, he said, reduced the duty on un-processed softwood sleepers and sleeper blocks from the sum of £7 to 8s. a standard. So long as softwood sleepers cost more than £4 a standard, 8s. a standard would be less than the present *ad valorem* duty of 10 per cent.; if, however, the price ever fell to less than £4, that would be an increase in the existing rate of duty. Brigadier

Mackeson explained the reasons for the high price of softwood sleepers, and pointed out that the order did not apply to hardwood sleepers, the duty on which remained at 10 per cent.

The motion was agreed to.

Questions in Parliament

Nationalised Transport Appointments

Mr. W. F. Deedes (Ashford—C.) on June 12 asked the Minister of Transport, whether, in view of the expiry of appointments of six out of seven chairmen, 23 out of 24 full-time Members and eight out of 13 part-time Members of the B.T.C. and its six Executives on or before September 30 this year, and in view of the tasks which, in accordance with the provisions of the White Paper, the Government required certain of these officials to fulfil, he would state to what extent it was intended to extend their appointments and for how long.

Mr. A. T. Lennox-Boyd wrote in reply: I am anxious to give the members of the Commission and the Executives the earliest possible information as to their personal future and I propose to discuss the position with each of those concerned. I intend to offer to renew the majority of their appointments for one year, though not necessarily in their present capacities.

A Transport Tour in the Netherlands

A correspondent's impressions of the recent visit to the Netherlands by the Institute of Transport

Since Mr. F. Q. den Hollander, President of the Netherlands Railways, read his paper entitled "The Future of Railways" before the Institute of Transport in London on November 20, 1950, the Institute had contemplated a visit to Holland and this eventually took place from May 19 to 27 this year. Members returned with many and various impressions of their short stay—not only of the technical installations which had been shown to them, but also of much delightful and well-arranged hospitality.

The most abiding reflection in the minds of all the British party must surely be how devotedly and skilfully the Dutch people have laboured to repair the ravages of war. It was difficult for the visitor to discern any traces of wartime damage in the great ports of Rotterdam and Amsterdam; and yet not one of the quay cranes or other mechanical installations at either port was left in working order by the time the Germans left the country. The intensity and success of this post-war reconstruction effort was visible on the railways not less than at the ports. It is recognised in Holland that an effective railway system is something of national importance, and the reconstruction of the Netherlands Railways has evidently received some reasonable degree of priority in the allocation of materials. Nevertheless, it is an impressive performance to have converted the shattered railway network of 1945 to the splendid system that is to be seen today. On May 17 the long stretches of line to Leeuwarden and Groningen in the north of Holland were turned over to electrical operation. There remains only the comparatively short stretch (from Arnhem to Zwolle) to be electrified, after which the whole present electrification programme will be completed. The remaining lines are to be worked by diesel traction.

Standards of punctuality are very high, and the special trains in which the party travelled ran well to schedule throughout. The railway members of the party found much that was noteworthy in the practices and equipment they saw. Such, for example, was a new signalbox installation, where the points and signals at a fairly complicated junction are now controlled from a single frame of the "NX" pattern, replacing five previous signal boxes, and operation in either direction on the two roads to Utrecht station is made possible. It was remarked that there was no form of mechanical or electrical interlocking with the level-crossing gates on a fairly important road situated at the point of junction; there was merely a notice on the signal diagram: "Remember the Gates."

An afternoon that will long be remembered by those present was devoted to a show of rolling stock, both old and new, of the Netherlands Railways. This show was most conveniently contrived for the spectators, who sat on one of the wide platforms of the modern Amstel Station at Amsterdam while locomotives (steam, diesel and electric) and passenger and freight rolling stock were driven past. (The administrative feat by which this was achieved on lines normally used for running and was carried through without a hitch compelled admiration). One feature in the railway workshop organisation is that no new construction of locomotives and rolling stock is undertaken. Furthermore, certain classes of very heavy repairs are carried out by the *Werkspoor Company*, which is the railways' main contractor.

A thought that must have occurred to many members taking part was that in Holland one of the principles for which the Institute of Transport stands is put

into practice: that transport is a unity. Dr. Plesman, the President of the K.L.M. air line, in a witty and profound speech at Schiphol Airport, made this point with particular effect. They thought, he said, that there was no reason for one form of transport to look glum if another one was doing well. It would be more correct to take the view that if the other man was doing well things were better for everybody. In pursuance of this thought, the wisdom and experience of the top management are made available, and are themselves broadened, by the allocation of seats on the boards of directors to the managers of other large national undertakings.

Schiphol Airport, of whose buildings only a wall some ten feet long and twelve feet high was left standing in 1945, provided another example of the reconstruction work that has been so well carried out in seven years. Something has already been said of the seaports; the port of Rotterdam hums with business, and the great waterways on which the economic life of Holland depends appear to have been entirely restored. In Rotterdam, where a large area in the very centre of the city, bombed in 1940, remains cleared and not yet rebuilt, the Institute party was conveyed in one of the new tramcars with which the Rotterdam Tramways Company is beginning to replace its existing fleet. The electrical equipment for most of these new cars has been supplied by the Metropolitan-Vickers Electrical Co. Ltd. The smooth running and comfort of these trams were evidently a considerable surprise to many of the visitors.

In accordance with the intention of the programme, which was to view transport in its widest sense, visits were also paid to the impressive dyke whose construction has turned the former Zuyder Zee into a fresh-water lake, and also to the rehabilitation work, now almost complete, of the reclaimed land at Wieringen which had been flooded again in 1945. The party also visited an oilfield at Oud-Schoonebeek, in the north-east, close to the German border, where production already amounts to one quarter of the nation's total oil consumption. The second part of the process of oil production was seen at the great refinery at Pernis, near Rotterdam.

None of the party could fail to be impressed by the sense of order, precision, and tidiness visible almost everywhere in transport undertakings, in the housing, and

in many of the smaller details of life. There is, in fact, a strikingly high standard of design in ordinary things throughout the whole country. The kind hospitality of their hosts and hostesses will certainly be remembered. There has for many years been a close sympathy of outlook between the British and the Dutch nations, which was forged into a deeper unity of purpose in the years from 1940 to 1945, and many personal relations were established during the visit which will carry this tradition on.

SS. "Lord Warden" Trial Cruise

A trial cruise of British Railways new car ferry ss. *Lord Warden* was made between Dover and Boulogne on June 16, with Mr. John Elliot, Chairman of the Railway Executive, present. He was accompanied by Mrs. Elliot, who launched the vessel at Dumbarton last December.

Shortly after arriving on board the *Lord Warden* Mrs. Elliot unveiled a print of Dover harbour which she had presented to the ship and was thanked by Captain Walker, the ship's Master.

At a luncheon during the crossing, Mr. R. P. Biddle, Docks & Marine Manager, Southampton, briefly introduced Mr. John Elliot. Mr. Elliot said the *Lord Warden* was able to make the crossing in 1 hr. 20 min., though the scheduled service will take about 20 min. more than this.

He believed the public valued highly comfort, safety and regularity on such services and he thought the more facilities they provided, the more the public would travel. The *Lord Warden*, costing some £750,000 was a notable example of what British Railways provided in Cross-Channel facilities.

On arrival at Boulogne harbour, where a new terminal is under construction, the *Lord Warden* demonstrated the disembarkation of cars and motorcycles by means of the ramp specially provided for this traffic. Greetings were exchanged between ship and shore and Mr. Elliot, who was later entertained on shore by the French authorities, received the Mayor of Boulogne on board.

Further details of ss. *Lord Warden* are given elsewhere in this issue.

Contracts & Tenders

The Crown Agents for the Colonies have recently placed a contract with Charles Roberts & Co. Ltd., for 25 bogie and ten four-wheel tank wagons for the East African Railways & Harbours.

Walker Bros. (Wigan) Ltd. has received an order from the Cyrenaica Railway for a dual-directional diesel-mechanical railcar with a top output of 107 b.h.p. and a top speed of 42 m.p.h. This car is to have a Gardner oil engine, Vulcan-Sinclair fluid coupling, and Wilson epicyclic gearbox. Two classes of accommodation are to be provided.

In an official statement on rolling stock orders, the Government of Pakistan, Ministry of Communications, is said to have recently placed orders for 235 carriages in France and for 45 carriages in Japan. Plans are being finalised to order 209 more. 122 broad-gauge (10 air-conditioned) and 113 metre-gauge lightweight all-steel coaches have been ordered from France for the North Western Railway and the Eastern Bengal Railway, respectively. Delivery is to commence in October, 1952, and is expected to be completed by June, 1953. An order for 45 metre-gauge passenger carriages for the Eastern Bengal Railway has been placed in Japan, the delivery of which will be completed by November, 1952. In addition, tenders have been called for 123 broad-gauge lightweight carriages for the North Western Railway and 86 metre-gauge lightweight carriages for the Eastern Bengal Railway.

An order valued at £1,700 has been placed with the Dunlop Rubber Co. Ltd. for 390 Dunlopillo cushions and 390 squabs for the Sierra Leone Railway. Among other orders recently received by that company is one for 30 mattresses for the East African Railways & Harbours. Dunlopillo cushions and squabs are also to be used in the seats for 60 drivers cabs of "J" class locomotives now being built for the Victorian Railways, Australia.

Coras Iompair Eireann has ordered 88 diesel-engine Royal Tiger bus chassis from Leyland Motors Limited. They will be fitted with bodies of C.I.E. design and



Captain G. D. Walker, Mr. John Elliot and Mr. R. P. Biddle during the cruise of the "Lord Warden"



Mrs. Elliot unveiling the print of Dover Harbour she has presented to the ship

manufacture in Dublin, and will be the first underfloor-engine buses to be operated by C.I.E.

The East African Railways & Harbours are enquiring, through the Crown Agents for the Colonies, for four 300-b.h.p. and three 500-b.h.p. diesel shunting locomotives for the metre gauge.

The closing date of the call for tenders for the electrification of the Egyptian State Railways line between Cairo and Helwan has been further postponed from June 4, until 11.30 a.m. on August 5, according to a recent Board of Trade, Special Register Information Service, report. The tender was referred to in our January 25 issue.

The Board of Trade, Special Register Information Service, recently stated that a call for tenders has been issued by the Government of Pakistan, Ministry of Communications, Railway Division, for the supply, complete with underframe, vacuum-brake fittings, drawgear, buffing gear, and painted, of eight metre-gauge six-wheel bogie wheel wagons "MBW" type, for the East Bengal Railway. Tenders should reach the Office of the Director General, Railways, Government of Pakistan, Karachi, by 12 noon on August 2.

A copy of the tender documents only (without drawings) is available for inspection by representatives of United Kingdom manufacturers at the Board of Trade, Commercial Relations & Exports Department, until June 30, after which date they will be available on loan in order of written application.

A further Board of Trade, Special Register Information Service, report states that the following call for tenders has been issued by the Central Uruguay Railway:—

Six laminated springs for locomotives.
96 elliptical and semi-elliptical silico-manganese steel springs for coaches and wagons.
2,154 helical silico-manganese steel springs.

Tenders should reach the Central Uruguay Railway, Montevideo, by 3 p.m. on July 8. A copy of the tender documents in Portuguese, with drawings, is available for inspection by representatives of United Kingdom manufacturers at the Board of Trade, Commercial Relations & Exports Department.

The United Kingdom Trade Commissioner at Melbourne has informed the Board of Trade, Commercial Relations & Exports Department, of a call for tenders issued by the Victorian Railways Commissioners for the supply of 300 tons of steel dogspikes, to specification. Tenders should reach the Secretary for the Victorian Railways, Melbourne, by 11 a.m. on July 16. A copy of the tender documents is available for inspection by representatives of United Kingdom manufacturers at the Board of Trade, Commercial Relations & Exports Department, until June 25. After this date it will be available on loan in order of written application.

CLACTON INTERVAL SERVICES, EASTERN REGION.—With the summer train services beginning on June 30, the regular interval service between Liverpool Street and Clacton-on-Sea will again operate. Trains will leave Liverpool Street at regular hourly intervals from 8.36 a.m. to 7.36 p.m., and at 9.36 p.m.; they will leave Clacton from 8 a.m. (S.X.), 9 a.m. (S.O.), to 8 p.m. With few exceptions these trains will convey through carriages to or from Frinton-on-Sea and Walton-on-Naze.

Notes and News

Revision of C.N.R. Capital Structure.

The Bill for the revision of the capital structure of the Canadian National Railways has passed its second reading in the Canadian House of Commons. The amount of \$736,385,000 owing to the Government is to be written off, and replaced by an equivalent amount of 4 per cent. non-cumulative preferred shares.

Eastern Region Named Train Restorations.

—As well as the restored "Capitals Limited" on its improved timings (see our June 6 issue), several other named trains will resume running on the Eastern Region with the summer timetables on June 30. They are the "Scarborough Flyer," Kings Cross—Scarborough on Fridays and Saturdays, with through carriage to Whitby; the "Easterling," Liverpool Street to Beccles, Lowestoft and Yarmouth on weekdays; and the "Norseman," Kings Cross and York to Newcastle Tyne Commission Quay on Wednesdays and Saturdays for passengers sailing by the Bergen Steamship Company's vessels only.

Presentation of Long Service Medals in East Africa.

—The presentation of long service medals to three members of the East African Railways & Harbours St. John Ambulance Corps, Nairobi, took place in the Conference Room at Railway Headquarters, on May 26. The ceremony was attended by Mr. A. Dalton, General Manager, East African Railways & Harbours and President of the Railway St. John Ambulance organisation; Sir Godfrey Rhodes, Colony Commissioner; Sir Reginald Robins, Patron; Mr. R. Osgathorp, Vice-President. Mr. Dalton stressed the importance of making European members of the staff actively interested in the organisation if the work of the Brigade were to be maintained and developed and the training of Africans extended and their number increased. The medals were awarded to Corps Superintendent H. Harvey, Corps Officer W. H. D. Griffiths, and Corps Officer W. H. Davies. The accompanying illustration, taken on the occasion of the presentation, is noteworthy in that it shows the General Manager of the East African Railways & Har-

bours and the two former General Managers of the Kenya & Uganda Railways & Harbours (which in 1948 was amalgamated with the Tanganyika Railways & Ports Services to become the East African Railways & Harbours). From left to right are (facing camera):—

Messrs. J. T. A. P. Addington, Assistant Chief Operating Superintendent; C. T. Hutson, Chief Commercial Superintendent; H. Lowles, Stores Superintendent; G. Gibson, Chief Mechanical Engineer; J. H. Baldwin, Chief Accountant; Sir Reginald E. Robins, Commissioner for Transport (General Manager 1942-1948); Mr. A. Dalton, General Manager since 1948; Sir Godfrey D. Rhodes, General Manager, 1928-1942, Mr. R. Osgathorp, Staff & Welfare Assistant.

Dorman & Smith Limited Miniature Circuit Breaker.

—Following the success of the demonstrations in London and Glasgow of the Miniature circuit breaker, Dorman & Smith Limited will give four demonstrations in Birmingham on July 15 and 16, dealing with the technical aspects and applications of the product. The demonstrations will be at the Chamber of Commerce, Birmingham, at 11 a.m. and 3 p.m. each day. Accommodation is limited, and applications to attend should be made to Dorman & Smith Limited, Manchester, 5.

Canadian Gas-Turbine Engine.

—The Canadian coal industry intends to introduce on the railways a coal-fired gas-turbine locomotive. Experiments on the engine have been in progress for some time at McGill University. Next year the industry hopes that the railways will co-operate in the creation of a prototype. The Dominion Government is contributing \$100,000 to the experiment. The advantage of the turbine is that it will use low-cost powdered coal, and it will be able to operate at extremely low temperatures much more efficiently, it is claimed, than the diesel.

Unpainted Aluminium Car for London Transport.

—Unpainted aluminium rolling stock is to be tried out on London Transport railways. One such car went into service on the District Line last week.



Presentation of medals to members of East African Railways & Harbours St. John Ambulance Corps (see paragraph above)

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

MECHANICAL ENGINEERING DRAUGHTSMAN required by London Firm in Victoria area. Write stating details of age, experience, qualifications and salary asked.—Box 511, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

FOR SALE. Hangar (all steel) 113' clear span \times 135' long \times 25' clear height at eaves, rising to 35' clear at apex. Doors each end (gable optional). Hangar (all steel) 80' clear span \times 144' long \times 22' clear height at eaves, rising 32' at apex. Doors one end. Steel building 80' clear span \times 144' long \times 22' clear height at eaves. Large sliding doors in sides. Curved steel building 35' span \times 17' 6" high at apex. Up to 600' long (low price). **BELMAN HANGARS LTD.**, Terminal House, London, S.W.1.

JUNIOR TRAFFIC OFFICIAL with Railway Traffic apprenticeship experience required for the Southern Railway of Peru, age 20/25 years, single, knowledge of Spanish would be an advantage. Apply to the SECRETARY OF THE PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

REQUIRED for the Southern Railway of Peru. Locomotive, Carriage and Wagon Senior Draughtsman 30/35 years of age. Qualifications: Must have served a full general apprenticeship in an Engineering workshop (preferably Railway) and have had at least five years' drawing office experience with some time in an executive capacity. A knowledge of Spanish an advantage. Future prospects. Apply to the Secretary, PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

N.E.R. HISTORY.—Twenty-Five Years of the North Eastern Railway, 1898-1922. By R. Bell. C.B.E., Assistant General Manager, N.E.R., and L.N.E.R. Companies, 1922-1943. Full cloth. Cr. 8vo. 87 pages. 10s. 6d.—*The Railway Gazette*, 33, Tothill Street, London, S.W.1.

and a complete train will follow later in the year. The usual London Transport red livery will appear only in a 3-in. band below the windows and in the name transfers. If unpainted aluminium cars are found to be practicable under normal operating conditions, a considerable saving in initial cost and maintenance could result. For some months a single aluminium panel has been exposed on a Northern Line train and appears to have suffered little from weather, dirt, or washing. Of the 90 light alloy cars on order for the District Line, 54 have now been delivered, all painted in standard red.

British Railways Coal, Iron and Steel Carriages.—Coal cleared by British Railways from deep-mined pits and open-cast sites during the 48 hr. ended 6 a.m. on June 16, amounted to 248,550 tons, bringing the week's total up to 3,097,880 tons. During the week ended June 7, 182,450 tons of iron and steel were conveyed by rail from the principal steelworks.

Use of De La Rue Products in Cafeteria Car.—Thomas de la Rue & Co. Ltd. materials have been used in the prototype cafeteria car described in our May 16 issue. The walls and seat-backs are panelled in primrose-coloured softglow Formica. Bar counter and table-tops have a surface of ivory softglow and the ceiling is of off-white Traffolyte. Floor-covering is in red and grey mottled plastic squares.

Institute of Transport.—The following dates have been fixed for meetings and functions of the Institute of Transport during the 1952-53 session: October 13, Presidential Address; November 17, Ordinary Meeting; December 8, Henry Spurrier Memorial Lecture; January 12, 1953, Ordinary Meeting; February 9, Brancker Memorial Lecture; March 16, Ordinary Meeting. All these meetings are due to be held at 5.45 p.m. at 66, Portland Place, W.1. The Anniversary Luncheon will be on November 12, the Annual Dinner on March 20, 1953, and Informal Luncheons on February 24, and April 28.

151 Railway Maintenance Squadron, Royal Engineers.—The annual 15 days training of 151 Railway Maintenance Squadron, R.E., a unit of 18 Railway Group, Royal Engineers, Supplementary Reserve, was carried out this year from May 24 to June 7, at the Transportation Centre, Longmoor, Hants. A four-day exercise provided the Squadron with training in its operational role of repairing permanent way when subjected to interference from enemy attack. The

squadron constructed half of a 110-ft. span four-girder bridge, which will be completed and launched by following units later in the camp scheme. There are vacancies in the Squadron in most trades, particularly for platelayers, steelwork erectors, drivers, carpenters, and clerks. Persons interested in joining should write to the Officer Commanding, Major E. R. Newens, R.E., at 6, Montague Road, Berkhamsted, Herts., for further details. Normal pay and allowances for the rank and trade are payable for the 15 days training, with a tax free bounty of £7 10s. a year for other ranks, as well as efficiency pay of £1 10s.

Technical Films on Loan.—A selection of films is available on loan free of charge to educational establishments, scientific and technical societies and other organisations, and also to individual firms for showing to their own employees only, from the Petroleum Films Bureau, 29, New Bond Street, London, W.1. A list of titles with brief synopses is available from that address. Among the films that may be borrowed is one on the Fell diesel locomotive in which animated diagrams show the working of the transmission system. This is a sound film running for 16 minutes, and is available in the 35 mm. and 16 mm. sizes.

M.I.C. Semi-Finals at Crewe.—On June 10 at Crewe a York team of locomotive firemen finished first in the semi-final of the All-Britain Mutual Improvement Class Quiz Competition of British Railways after additional questions were included following a dead heat. The Quiz Master was Mr. H. N. S. Edwards, District Motive Power Superintendent, Bristol. The York team tied with Derby with 57 points after completion of the set questions. Six additional questions were then put to each team and York emerged as winners by one point—68 to 67. York will now take part in the final competition in London on June 26, meeting a team from Eastleigh, Southern Region.

G.N.R. Centenaries Special Train.—To celebrate the centenary of the opening of Kings Cross Station in October, 1852, and the opening of the Towns Line between Werrington Junction and Retford via Grantham and Newark in August of the same year, it is proposed, with the co-operation of the Eastern Region, to run a special train between Kings Cross and York on Sunday, September 28, next. The train will be composed of open stock throughout, with two kitchen cars, and will be hauled by a class "A4" Pacific, pro-

REQUIRED for the Central Railway of Peru, Railway Stores Assistant (Clerical). Qualifications: Secondary School Education and holding School Leaving Certificate, preferably with some previous commercial experience. Age from 23 to 30 years. Knowledge of Spanish desirable. Single man preferred with experience in a Stores Department of a British Railway or an Engineering concern. Apply to—THE PERUVIAN CORPORATION LTD., 144, Leadenhall Street, London, E.C.3.

THE "PAGET" LOCOMOTIVE. Hitherto unpublished details of Sir Cecil Paget's heroic experiments. Eight single-acting cylinders with rotary valves. An application of the principles of the Willans central-valve engine to the steam locomotive. By James Clayton, M.B.E., M.I.Mech.E. Reprinted from *The Railway Gazette*, November 2, 1945. Price 2s. Post free 2s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

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bably No. 60022 *Mallard*. It is hoped that it will be possible for the train to run non-stop to York in approximately 3 hr. 10 min., though no decision has been reached on this point by the Operating Department. The fare for the journey will be 35s. a head, to include fare, light refreshments served at every seat on the outward journey and dinner on the return run. Tickets will be available shortly from:—Mr. A. F. Pegler, White Lodge, Rampton, near Retford, Notts, Mr. H. T. S. Bailey, 80, Bessborough Place, London, S.W.1, or Mr. L. J. W. Smith, 898a, High Road, Finchley, N.12. Early application is invited, as the seating accommodation is limited to about 450. Applications for tickets should be accompanied by a stamped addressed envelope.

Institute of Metals.—An all-day symposium on "Properties of Metallic Surfaces," arranged by the Institute of Metals, will be held in the Lecture Theatre of the Royal Institution, Albemarle Street, London, W.1, on Wednesday, November 19, from 9.45 a.m. to 5 p.m.

Dunlop Rubber Co. Ltd.—Available net profit for the Dunlop group of companies and the Dunlop Rubber Co. Ltd., for 1951 amounted to £4,607,413, compared with £5,062,863 in 1950. Export and overseas activities in the year under review were even more successful than in the preceding 12 months, and contributed more than half of the group profit. Total reserves and surplus of the group attributable to the Dunlop Rubber Co. Ltd. showed an increase during the year from £28.6 million to £32.2 million, and at the end of 1951 the group employed a total capital and funds from all sources of over £121 million.

Costa Rica Railway.—The loss for the year ended June 30, 1951, of the Costa Rica Railway Co. Ltd. was £45,584, compared with a profit of £4,508 for the previous year. The annual appropriation for first mortgage and second debenture redemption is £3,000, as for the preceding year; there is to be no provision on account of second debenture interest (against £1,508). The forward debit is £377,700 (£329,116). The accumulated unpaid interest, payable out of future revenue, amounts to £433,500, and arrears of annual payments due by subsidiary amount to £1,048,246. The Directors' report states before the 1949 flood damage could be repaired, landslides buried two miles of track, causing stoppages of seven weeks on the main line. The damaged

section was rebuilt temporarily; until the terrain becomes stabilised it is impossible to estimate the cost of permanent restoration. The annual general meeting will be held on April 8.

Butler Machine Tool Co. Ltd.—At a board meeting of the company at Halifax on May 27, the Directors resolved that the dividend on the 5 per cent. cumulative preference shares for the six months to June 30, 1952, be paid, less income tax at 9s. 6d. in the £. Dividend warrants in respect of this dividend will be posted on June 28 and the dividend is payable on June 30, 1952.

Famous Clyde Turbine Steamer for Scrapping.—The Scottish Region announces that the turbine steamer *King Edward*, which since the end of last season has been lying at Greenock, has been sold. The vessel is now the property of the British Iron & Steel Corporation, which is to scrap the vessel—the pioneer commercial turbine steamer—at Troon, Ayrshire. Recently the *Duchess of Argyll* was disposed of to the Admiralty; the war record plaques and builders' plaques of both vessels are to be preserved in the Railway Museum at 23, Waterloo Place, Edinburgh. British Railways have arranged with Dr. Stuart Henderson, Director of Museums, Glasgow, for the ships' bells of the *King Edward* and the *Duchess of Argyll* to be handed over to the Glasgow Corporation.

Proposed Manila Railroad Bonds Discussions.—Reuters reports that Colonel Bautista, the newly-appointed Manager of the Manila Railroad Company, has advocated an invitation to representatives of British bondholders to go to Manila to discuss a possible settlement of the Manila Railroad's bonds held by the Manila Railway Company (1906) of London. The plan was originally suggested by Mr. Pio Pedrosa, President of the Philippine National Bank, when he was Acting General Manager of the railway. Colonel Bautista said this plan would be advantageous both to the bondholders and to the railway, because bondholders' representatives would be able to "see the actual plight of the Company." He added that he would seek a conference with President Quirino very shortly, to discuss the proposal. Officials of the Railway are interested in having the bonds liquidated as the accumulating unpaid interest of more than one million pesos a year burdens the company's finances.

Forthcoming Meetings

June 23 (Mon.) to 25 (Wed.).—British Wood Preserving Association, Annual Convention at Queen's College, Cambridge.

June 26 (Thu.).—Railway Benevolent Institution, at Euston Station (Room 131), at 4 p.m. Annual Meeting.

June 27 (Fri.).—St. Christopher's (Railway Orphanage), Derby. Annual Meeting, and Distribution of Prizes by Sir Ronald W. Matthews, President of the Railway Benevolent Institution, and Lady Matthews. Annual Meeting in the Committee Room at 2.15 p.m.; Distribution of Prizes in the Dining Hall, at 3.15 p.m.

June 28 (Sat.).—Permanent Way Institution, Leeds Section, visit to Edgar Allen & Co. Ltd., Imperial Steel Works, Sheffield.

Railway Stock Market

There has been only moderate business in stock markets where fluctuations in British Funds, international political developments, and reports that earnings of many industrial companies are running at lower levels this year, all again made for caution. British Funds have turned firmer at the time of going to press, though there was little response to Mr. Butler's recent news that in the current quarter the decline in gold and dollar reserves has been less than £10,000,000. Moreover, after an earlier reaction, the value of the pound in New York has strengthened. The £22,000,000 of additional 3½ per cent. Treasury (coal) stock, issued as compensation for nationalised colliery assets, is being rapidly sold by the former colliery companies; but the price of this stock has steadied, because, it is said in the market, of official support.

Foreign rails reflected the inactivity of markets, and small sales tended to affect prices sharply. Manila "A" debentures receded to 75 and the "B" to 63 following a little selling. Sentiment failed to benefit from latest reports of a move to deal with the arrears of interest on Manila Railroad bonds, which are virtually the only asset of the Manila Railway Company.

Antofagasta ordinary and preference have been easier at 10½ and 52 respectively, despite the further payment announced in respect of preference dividend arrears. Brazil Rail bonds eased to 5½ following the annual report. United of Havana 5 per cent. debentures receded further to 12 due to absence of demand.

Leopoldina ordinary and preference were 11 and 28½ respectively, while Leopoldina Terminal debentures were 20½ and the ordinary units again quoted at 8½d.

Mexican Central "A" debentures at 69 also reflected the general trend. San Paulo 10s. units were 11s. 7½d., while Nitrate Rails shares were 20s. 6d. and Taltal 15s.

Canadian Pacifics changed hands around 56½, with the 4 per cent. preference stock 62½ and the 4 per cent. debentures 79½.

Bolivar "C" debentures have been marked up to 50 after news of the liquidation payment. Chilean Northern 5 per cent. debentures were dealt in at 30, Paraguay Central 6 per cent. debentures at 19½, and Guayaquil & Quito 5 per cent. debentures at 28.

British Transport stocks have not been affected by the financial results, and, as usual, moved closely with the general trend in British Funds, although the accounts have revived recent market talk that more capital may have to be raised in the future. It is now being assumed that if more capital has to be raised, an issue is likely to be left until later in the year when general market conditions may be more favourable. Transport 3 per cent. (1978-88) has been changing hands around 74½, at which there is a yield of not far short of 4½ per cent.; this, however, compares with a yield of nearly 4½ per cent. on War Loan 3½ per cent. It is being argued that compared with nationalisation and other long-dated stocks, 3½ per cent. War Loan seems relatively undervalued. War Loan can be redeemed in December next or after, but in view of the large amount of this stock in issue, redemption is generally expected to be postponed for a long while.

Engineering shares were again a fairly steady feature, because in many cases yields at current prices are not unattractive. Although E.P.L. and the higher distributed profit tax will leave little scope for increased dividends, profits generally may be well maintained because of rearmament and allied work, and there are good prospects of dividends being kept at last year's levels.

Guest Keen were 48s. 6d., Babcock & Wilcox 60s. 9d., T. W. Ward 69s., Ruston & Hornsby 31s. 10½d., Vickers 41s. 3d., and Cammell Laird 5s. shares 11s. 3d. British Oxygen were 69s. 6d., Tube Investments 50s. 6d., and John Brown 38s. 9d.

Among shares of locomotive builders and engineers, Vulcan Foundry changed hands around 21s. 3d. North British Locomotive were 14s. Beyer Peacock moved up to 28s. 6d., while Wagon Repairs 5s. shares were 11s. 9d. and Gloucester Wagon 10s. shares 11s. Charles Roberts 5s. shares kept steady at 19s. 9d., Birmingham Carriage were 32s. 3d., and at Glasgow, Hurst Nelson were 49s. Most shares of locomotive builders are on a basis showing attractive yields, and unless there are further cuts in steel supplies, there seem to be reasonable prospects of dividends keeping at last year's rates. On the other hand, a recovery in share prices probably must await a general rally in stock markets.

Traffic Table of Overseas and Foreign Railways

Railway	Miles open	Week ended	Traffics for week		No. of week	Aggregate traffics to date	
			Total this year	Inc. or dec. compared with 1949/50		Total 1950/51	Increase or decrease
South & Cen. America			£	£		£	£
Antofagasta ...	811	6.6.52	175,240	+ 31,120	23	3,585,180	+ 1,030,520
Costa Rica ...	281	Apr., 1952	cl.422,467	+ c649,068	44	cl.2,846,170	+ c3,234,296
Dorada ...	70	Mar., 1952	32,729	+ 1,506	13	102,429	+ 5,679
Inter. Ctl. Amer. ...	794	Apr., 1952	\$1,085,825	+ \$214,744	17	\$4,754,984	+ \$130,795
Paraguay Cent. ...	274	28.12.51	G289,547	+ G102,688	26	G8,823,911	+ G3,556,978
Peru Corp. ...	1,050	May, 1952	\$8,680,000	+ \$856,000	48	\$92,012,000	+ \$7,791,000
" (Bolivian Section)	66	May, 1952	Bs.19,347,000	+ Bs.1,468,000	48	Bs.181,091,000	+ Bs.36,709,000
Salvador ...	100	Mar., 1952	c225,000	- c11,000	39	cl,607,000	+ c44,000
Taltal ...	147	May, 1952	\$3,818,000	+ \$1,562,000	48	\$25,978,000	+ \$7,109,000
Canada							
Canadian National†	23,473	Apr., 1952	17,908,000	+ 1,089,000	17	71,822,000	+ 7,364,000
Canadian Pacific†	17,037	Apr., 1952	11,982,000	+ 300,000	17	47,926,000	+ 3,542,000
Various							
Barel Light* ...	167	May, 1952	29,565	- 2,895	9	66,825	- 15,862
Gold Coast ...	536	Mar., 1952	321,377	+ 34,061	52	3,475,842	+ 335,178
Mid. of W. Australia†	277	Mar., 1952	52,253	+ 11,130	39	522,599	+ 165,102
South Africa ...	13,398	10.5.52	1,996,041	+ 73,296	6	11,459,395	+ 680,357
Victoria ...	4,744	Feb., 1952	2,176,542	+ 436,697	35	—	—

* Receipts are calculated at 1s. 6d. to the rupee

† Calculated at 83 to £1